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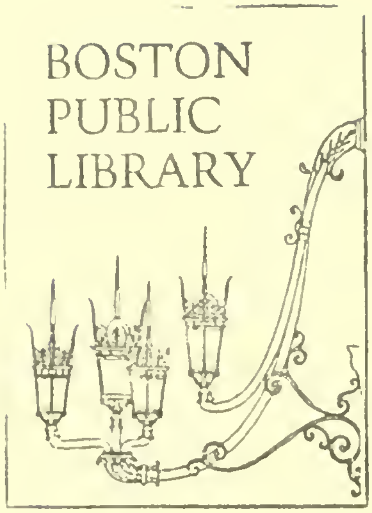

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NEW COMMUNITY STUDY

Progress Report and Interim Summary II

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October, 1969

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INTRODUCTION AND SUMMARY

Since March, 1969, the feasibility of a New Community Development in Dorchester Bay has been under study. The following material is a summary and progress report of this activity. It explores a set of options available to the City, with the goal of eliciting the kind of policy response that will guide and focus the future of this study. It also outlines staff and consultant studies required to carry this work towards the objective of a plan for a new community in Dorchester Bay by February, 1970.

Objectives

The major objective of this study has been to suggest the optimum use of the site resources of Dorchester Bay in alleviating major problems facing the City of Boston -- notably housing, employment, recreation, and fiscal problems.

Underlying this objective is the goal of preparing a plan for Boston's Harbor Islands to test against any forthcoming legislation concerned with this important area of the City's responsibility.

Method of Study

There are two parts to a planning study of this kind. The first is to decide what is to be planned; the second is to plan it.

This report is concerned with the first part. The methodology used is akin to cost-effectiveness analysis; the quantitative comparison of alternative policy options. A set of quantitative models are used to simulate alternative development possibilities for the site. These alternatives are selected to include a feasible range of available options, given the objectives of development and the constraints revealed by a site reconnaissance.

The benefits and costs of the alternative development models are assessed and compared. Of course, this is easier said than done. Whenever possible, costs and benefits are quantified in units such as dwellings, acres, jobs or dollars. However, a large part of the problem is concerned with estimating political, social or aesthetic costs, and making subjective value judgments on the priority of one kind of benefit over another. Faced with this problem, the best we can do is to quantify whatever is objectively quantifiable, and to ask the reader to judge whether the added costs of the more "expensive" alternative are justified by its added "intangible" benefits; or conversely, whether the "intangible" costs of the "cheaper" alternative are justified by the money saved.

On the basis of this kind of judgment, which the following analysis is intended to elicit, a single option or a narrow range of options can be selected for detailed planning and

analysis. That activity would form the second part of this study.

Progress and Limitations

Four models simulating alternative development options in Dorchester Bay have been built and tested. Although further alternatives may be added to this analysis, the results of the study hold some promise for the feasibility of a New Community Development in Dorchester Bay.

However, the limitations of this study should be noted. While it has analysed the relative merits of alternative development policies within the site area, it has not attempted to compare the advantages of developing a New Community with other investment opportunities facing the city. Nor has it compared the merits of this site against other sites in Boston that may be available for a New Community. However, a study of a New Community on the Brook Farm site in West Roxbury is under way, using the kind of analysis that will make a valid comparison between the two sites possible.

Summary & Evaluation

Four new community development models have been tested. The policy variables that distinguish these models are:

a. The size of the community in terms of housing and employment.

b. The income structure of the population.

c. The extent to which the recreation potential of the islands is realised or sacrificed.

The following table summarizes the distinguishing characteristics of these alternatives:

	HOUSEHOLD INCOME		EXTENT OF
SIZE OF COMMUNITY	MODERATE -- MIDDLE INCOME	MIDDLE -- UPPER INCOME	RECREATION LAND USE
12,600 dwelling units	Model A	Model B	115 acres
7,500 dwelling units	Model C	Model D	270 acres

Models A and B assume a larger population and a lesser recreation use of the islands; Models C and D assume the reverse.

Models A and C assume an income structure that emphasizes moderate and middle income families; Models B and D stress middle and upper income households.

* * * * *

Table I summarizes the major dollar costs and benefits estimated for each alternative. This Table shows that a New Community of 12,600 dwelling units could be built at a profit for a community developer. With a moderate-middle income population, the profit would be marginal; with a middle-upper income population, the profit would be more substantial.

The developer of the smaller community of 7,500 dwelling units would lose money unless an additional subsidy is provided in exchange for the extensive land set aside for recreation. The extent of this subsidy would be modified by the income structure of the community population.

In return for a subsidy of $11 million to $14 million, 270 acres of beach front would be available for public use, rather than 115 acres. This would amount to a purchase price of about $1.00 to $1.25 per square foot, or $43,000 to $55,000 per extra acre.

Such a subsidy would permit the developer to balance his books. To allow him to show a profit on a smaller community that compared to his profit on the larger, the subsidy exchanged for the recreation land would increase to $15 million to $17 million, about $1.40 to $1.60 per square foot, or $60,000 to $70,000 per extra acre.

How can one evaluate such an investment? Although it is difficult to place a dollar value on recreation land, a strong case could be made in favor of a public investment of say $15 million in purchasing this beach front. The demand for recreation space in the region is projected by the Massachusetts Outdoor Recreation Plan to grow by 250% in the next 30 years.

Most of this demand will be concentrated in the regional core where the potential chance of increasing present recreation facilities is minimal. A growing proportion of this demand will be for water-oriented recreation.

Nor can land costs of $1.00 to $2.00 per square foot be considered excessive. Land available in Boston can cost anywhere from $3.00 to $10.00 per square foot; and land equivalent to this beach front acreage would probably fall in the upper end of this range. If the purchase of this beach front were financed on the basis of user charges, a fee of 50 cents a head would cover financing and amortization costs over 20 years, even without supplementary revenues from marinas and other concessions. The problem remains to identify the proper financing and funding mechanism for this purchase.

* * * * *

Table I shows that the net costs to the City of Boston would amount to about $16 million for the larger community, and $8 million for the smaller (excluding the additional subsidy mentioned above). Under the funding formulae assumed, the City would fund public facilities such as schools, fire and police. Unless this Community represents a net addition to Boston's population, the chances are that the City would be faced with similar expenditures in the normal course of events. Therefore,

NEW COMMUNITY ALTERNATIVE MODELS
SUMMARY OF COSTS AND BENEFITS TO CITY
($ MILLIONS 1969)

	# of Households	Average Household Income ($)	# Jobs	Gross Cash Cost To City ($Millions)	Net Cash Cost to City[1] ($Millions)	Gross Tax Benefit To City[2] ($ Millions)	Recreation Benefit (Acres)	Community Developer Profit (+) or Loss (-) ($ Millions)
Model A	12,600	8,500	16,000	19.92	16.14	9.68	115	+ 3.41
Model B	12,600	10,250	16,000	19.92	16.14	11.54	115	+ 8.41
Model C	7,500	8,500	11,000	12.01	8.23	5.77	270	- 13.88
Model D	7,500	10,250	11,000	12.01	8.23	6.77	270	- 10.98

[1] Equals gross cash cost minus revenue received from land sales to Community Developer.

[2] For details see Appendix E

the net additional cost of a New Community to the City's budget would be considerably less than the figures shown.

As it stands this analysis probably underestimates the cost differences for Models with different household income structures. One major variable probably affected by the population's income structure is the average number of people per household. For the sake of simplicity this ratio is held constant for all Models. Furthermore, a ratio of 3.4 persons per household is assumed. This is a very high ratio, and its use reflects two factors. The first is the urgent need for new housing felt by families with children in the City. The second is a policy to discourage the continued out-migration of these families to the suburbs. To reflect alternative policy assumptions, this ratio could well fall as low as 2.5 persons per household. This would reduce the population of the community from 42,000 to 31,000 for Models A and B, and from 25,000 to 19,000 for Models and D. The capital and operating costs to the City would then be reduced almost proportionately.

A summary of the capital costs estimated for each Model is set out in Table II. This Table illustrates the high level of fixed costs that are not influenced by a change in the number of households. The high costs of the bridge and causeway links to the islands accounts for this phenomenon. Although Models C and D house a population only 59% as large as Models A and B,

NEW COMMUNITY ALTERNATIVE MODELS

TABLE II. SUMMARY OF CAPITAL COSTS

($ millions 1969)

	TOTAL CAPITAL COSTS[1]	COMMUNITY DEVELOPMENT CORPORATION	FEDERAL	STATE	CITY[2]	MDC	MBTA	OTHER DEVELOPERS[3]	PUBLIC UTILITIES
Models A & B	478.70	23.13	48.71	40.02	19.92	3.12	7.01	329.91	7.47
Models C & D	315.81	20.69	32.72	27.60	12.01	4.46	-	210.87	6.17
% C & D / A & B	66%	90%	67%	69%	60%	143%	0%	64%	83%

---

1. Excluding financing, planning, and administrative costs.

2. These are gross costs excluding $4 million revenue from sale of land to developer. Net costs would therefore be reduced by this amount. Nor does this include costs of relocating Thompson Academy or Long Island Hospital.

3. For Models B and D these figures would be $350.41 million and $223.08 million respectively, with totals adjusted accordingly.

only the City's costs are reduced by a similar amount.

* * * * *

To date the study has not attempted to quantify the city-wide impact of this development on the population, housing stock, job market, or other public programs in Boston. In some sectors, the impact might be considerable. The housing projected in Models A and B would amount to 26% of the city's postwar housing supply. The new housing provided would amount to two-thirds of the housing planned for the Renewal Program. Because the development of Dorchester Bay would require no demolition of existing housing, its net contribution to the housing supply of Boston would be nearly six times greater than the Renewal Program. And, because a moderate-middle income new community would supply relocation housing, the indirect contribution of this Model, in freeing up substandard housing for redevelopment on a parcel or block basis, could be no less important. With the proper management of this relocation potential, the development of Dorchester Bay could possibly result in 18,000 or 20,000 new housing units in Boston, avoiding many of the social costs of enforced relocation. Alternatively the building sites provided by this relocation process could be redeveloped for industrial or commercial development.

In the final analysis, these quantifiable costs and benefits are only part of the information leading to the kind of decision

that will give continued direction to this study. The other major elements to be considered are the value placed on the potential of the site resources for recreational use as opposed to residential development, and the probable cost attributed to the political opposition to a plan that minimizes the recreational use of the islands. At the present state of the art, at least, these problems are not susceptible to a technical solution. What is possible, and has been attempted in this analysis, is the isolation and estimation of the quantifiable side to this equation. This poses the question of whether the recreational benefits and the political advantages of the plan that is more "expensive" in dollar terms justify this additional expense; or conversely whether the non-dollar values sacrificed by the "cheaper" alternatives are justified by the money saved.

Next Steps

If a plan for a New Community is to be prepared by February of 1970, we should at least touch base with the following studies:

a. In-House Studies
   - Community Relations Studies
   - City-wide impact analysis
   - Transportation Studies
   - Land-use Planning and Design Studies

b. Consultant Studies

Legal and Legislative Studies

Development Studies

Marketability Studies

Structural Engineering Studies (bridges and causeways)

Water Pollution and Ecology Studies

These studies are outlined in Section V. Their depth is bound to be limited given the time available. Highest priority should go to the community relations studies, legal and legislative studies, marketability and engineering studies.

II

SITE RECONNAISSANCE

Apart from tidal areas and mudflats, approximately 500 acres of land are potentially available for development in Dorchester Bay.

Land Area	Predominant Use	Ownership	Acreage
Columbia Point	unused	public	55
Thompson Island	Boys Academy	private	157
Spectacle Island	unused	public & private	74
Long Island	Hospital	public	213

In addition to existing land, there is the possibility of landfill. The Expo study analysed this possibility in detail, proposing both landfill and platforming to create development sites in the harbor, while reserving the islands for recreational use. This strategy, which involves extremely high land costs, may be acceptable given the special funding sources open to a world exposition. However, it incurs costs that cannot be sustained by normal development. Nor can the costs of extensive landfill be reasonably justified by the preservation of the harbor islands for recreational use, even if these costs are measured in dollars alone. These issues are discussed in greater length in Appendix E .

However, to realize the full potential of the islands themselves, a small amount of peripheral landfill may be justifiable. In these Models an outside limit of 50 acres of fill is

assumed, to expand the beach areas of the islands with sand. The impact of this landfill on this ecology of the Bay is an important issue to be studied. Ecological costs, in addition to high dollar costs may warrant eliminating even this limited area of fill.

Site Engineering. The islands themselves present geological conditions similar to many areas in Boston. We have no evidence that they will present unusual engineering problems.

Columbia Point is land made with poor quality fill over clay and bedrock at depths ranging from 100-200 feet. The Columbia Point Feasibility Study concluded that these conditions would add to building costs, but would not preclude development.

The engineering costs of bridges and causeways linking the islands are of critical importance to the feasibility of development. Bedrock conditions between Columbia Point and Thompson Island were surveyed in the course of the Expo Study. It is important that similar surveys are made along the links between the remaining islands.

Accessibility. The major access corridor to this development would be through Columbia Point from Morrissey Boulevard, Columbia Road and the South East Expressway. With the completion of the Interstate System, Columbia Point will be five minutes drive from the Inner Belt. Some of the congestion on the

South East Expressway might be relieved by the I-95 extension.

Road access to the mainland connection of the site is excellent. But even with bridge and causeway links, the islands themselves are unlikely to have the degree of accessibility that attracts transport-sensitive industrial and commercial development. However, the whole site, given a 15 minute transit link to Downtown, would be accessible enough for residential and some commercial development.

Environmental Quality. Aside from the problem of aircraft noise discussed below, the islands share an excellent environment for residential and recreational use, with an attractive topography and spectacular views across the harbor. These qualities, and the recreational potential of the site would be important assets in marketing residential development, especially for middle and upper-income housing. Although the harbor is not considered to have the potential to attract vacation and resort development in competition with other resorts in the region, its recreational assets would stimulate other kinds of commercial development.

The proximity of this site to Logan Airport is a great disadvantage. The islands suffer from the same levels of aircraft noise as large areas of South Boston, Somerville, Chelsea, Everett, Revere, and Winthrop. Although the islands

are not as noisy as East Boston, this condition remains a severe problem. At present noise levels, good sound insulation is expected to add from 8% to 14% to residential construction costs and, therefore, 3% to 6% to housing cost. Due to changes in aircraft design and operations technology, the predicted saturation of Logan by 1975, and a possible new airport for Boston, future noise levels around Logan are difficult to determine. It is almost certain, however, that things will get worse before they get better. Nevertheless, because this is a problem to which many other communities in Boston and elsewhere must shortly find an answer, we do not feel at this time that this problem alone should preclude urban development in Dorchester Bay. The resolution of this uncertainty must wait on Marketing Studies to determine the marketability of residential and commercial development under these conditions.

Recreation. Although the level of water pollution in Dorchester Bay presents a major constraint, the islands hold a valuable recreational potential for the residents of the City and the Metropolitan Core. However, it is doubtful if these islands could compete successfully with other beaches or boating areas in the region in attracting major tourist recreation activity. Given superior facilities elsewhere, the Harbor's unique advantage resides in its central location and its accessibility to core and city residents travelling mainly by bus or transit.

To make use of this recreation potential, a plan must strike a balance between development that can support the expense of road and transit access on the one hand, and between land set aside for recreational use on the other. In order to search for this pivotal area, two of the Models analyzed in this study allocate only 20% of the land area for open space recreation. The remaining Models reserve 50%. As a general scheme, the central areas of each island are developed for residential use while the shorelines are developed for intensive beach and marina activities.

Ecology. The ecological consequences of the development of the harbor islands are largely a matter of conjecture at present. With respect to the land areas involved, this issue is probably not the critical factor. On Columbia Point and Spectacle Island, both disused garbage dumps, the damage has already been done. Thompson Island and Long Island are both developed to some extent. While insensitive development, whether for recreation or residential purposes, can have effects as disastrous here as so often has occured elsewhere, there is no reason to assume that sensitive and informed planning cannot intensify the use and enjoyment of these islands without destroying them.

The tidal areas are another matter. Little information is available on the ecological conditions of Dorchester Bay, and what there is suggests that the deterioration that exists could

easily be accelerated. The obstruction of tidal flow by extensive landfill is the potential offender, and this obstruction should be minimized. The effects of development in the harbor on pollution, tidal flow and water quality management are already under intensive study at MIT. It is important that these studies are combined with an ecological analysis of Dorchester Bay.

III

ALTERNATIVE DEVELOPMENT MODELS

The purpose of this section is to describe the four development models built and tested, and to spell out the critical assumptions that underlie them. These alternatives are selected to test various policy options, and this section outlines the rationale behind this process.

Several assumptions are common to all the models selected. The first, concerning the average family size assumed, is discussed in Section I. In addition, both the site for the Community and the access routes to it are assumed to be limited to City of Boston territory. This excludes Moon Island which is owned by Boston but lies within Quincy, and eliminates the Squantum Point to Long Island bridge as an access corridor.

The third common assumption is the selection of a development period of ten years. A fourth common assumption is the assumed use of funds under Title IV of the 1968 Housing Act (New Communities). This requires a functionally heterogeneous development that adds to the supply of housing for low and moderate income families. It also requires that the community developer is some kind of development corporation other than a public body. A Chapter 121A Corporation would probably be acceptable under this Act.

All four models assume a similar distribution of land uses and an even spread of income groups and housing densities among the islands and Columbia Point. Each island, therefore, houses an economically heterogeonous population, although separate neighborhoods on any one island may not reflect this degree of integration. The four models also assume a policy of encouraging low density residential development for lower and moderate income families in order to increase the potential for homeownership among these households.

Model A

This model is used to test the upward limit to the intensity of urban use feasible for the Harbor Islands. In spite of this goal, the average density assumed, 25 units to the gross acre, is not high compared to many areas in Boston, such as South Boston (25 units/acre), Back Bay (41 units/acre), North End (61 units/acre) , or Beacon Hill (73 units/acre). Nevertheless, the assumed density is higher than neighboring North Dorchester (16 units/acre) or Savin Hill (8 units/acre). This density results in a community that leaves relatively little of the land area free for recreation use,unless a heavy reliance is placed on high-rise buildings.

A second goal of this model is to test the lower limit to the income structure feasable for a development that is financially self-sustaining as a capital investment for a profit-oriented community developer.

These assumptions generate a community of 42,000 people in 12,600 dwelling units. The average family income is $8,500, and the bulk of the population are in moderate income families, with 60% earning from $4,000 to $10,000. Table III compares this income structure to Boston and the region.

TABLE III

COMPARATIVE FAMILY INCOME STRUCTURES
FAMILY INCOME ($000's)

	0--4	4--7	7--10	10-14	14+
Boston 1960[1]	40%	33%	16%	8%	3%
Boston 1970[2]	33%	24%	22%	12%	9%
Boston 1980[2]	28%	19%	20%	22%	11%
Urban Core 1968[3]	15%	27%	24%	20%	14%
SMSA 1968[3]	11%	23%	26%	33%	17%
New Community Model A 1975-80	10%	30%	30%	20%	10%

---

1 U.S. Census Data
2 Our Projections Based on Census Data and EMRPP Projections
1965 Dollars
3 FHA Data

The level and the type of economic activity are derived from the study shown in Appendix A, coupled with discussions held with industrial and commercial development consultants.

This level of development leaves 20% of the land area free for open space and recreation. Although this is a comparatively high proportion compared with other communities in the City, it is not high in relation to the recreation potential of the Harbor site. Further details of this model are set out in Appendix A.

Model B

This model differes from Model A in that a more wealthy population is assumed. The income structure selected is that assumed by the EXPO New Community and is similar to the income structure of the SMSA. Fifty percent (50%) of this population would earn more than $10,000.

Family Income ($000's)	0--4	4--7	7--10	10--14	14+
Boston SMSA 1968	11%	23%	26%	33%	17%
New Community Model B	10%	20%	20%	25%	25%

This model is aimed to explore the effect of an increase in the income level of the community population on the development financing. Marketing studies are needed to see if this number of upper-income families would be prepared to buy into a harbor community.

In other respects, Model B makes the same assumptions as Model A. This again results in a population of 42,000 people in 12,600 dwelling units. The same levels of economic activity are assumed and the same land use pattern.

For details of this model, see Appendix B.

Model C

This model is designed to test the lower limit to the population size that can justify the high fixed costs necessary to make the islands accessible for recreation use. Whereas Models A and B assume 12,600 dwelling units, this model assumes 7,500 dwelling units, housing 25,000 people.

The objective of this change is an increase in the land area available for open space and recreation, from 115 acres to 270 acres, from 20% to 50% of the site area. This area of beach front park, nearly four times the combined size of Boston Gardens and Boston Common, would be an enormous contribution to the recreation assets of the City.

For this model, the moderate income structure of Model A was assumed, and the level of economic activity was estimated to fall by a similar amount to the change in population. This is discussed in Appendix F.

Model D

This model differs from Model C only in the income structure of the population. The middle income structure of Model B, is assumed, with 50% of the families earning more than $10,000.

The purpose of studying this model is to test the degree to which the financial difficulties of developing the islands with a small population can be modified by increasing the wealth of the community. These difficulties could be further reduced by increasing the land allocated for commercial use, but this expedient was not tested in this model.

This model is set out in detail in Appendix D.

IV

FINANCIAL FEASIBILITY

The issue of Financial Feasibility is a central question haunting any undertaking on the scale of this development. The purpose of the section is to explore this question.

The subject of this analysis is a Community Developer assumed to be responsible for only a limited part of the total development. Although there have been exceptions, Community Developers in the past have used sales of improved land as their main source of revenue, rather than income from building sales or rental. Thus the costs of constructing housing and commercial or public facilities do not enter into his financial calculations. Because the cost of land, roads and utilities remains constant regardless of the income of the community residents, this analysis can afford to ignore the effect of alternative household income structures on the Community Developer's costs. However, the sales value of land for housing, which forms a large part of his revenue, will be greatly modified by the income structure of the community population. This factor will account for the difference in the profitability of Models which assume contrasting household income structures.

This analysis does not look into the financing of construction on sites sold for development. The land prices estimated for these sites are assumed to be low enough, and the demand

for housing and commercial development high enough, to permit the profitable construction of these facilities. Detailed marketing and development studies are needed to test this assumption.

Capital Costs: The capital costs involved in the development of a new community in Dorchester Bay are considered in detail in Appendix E. While adequate for the present stage of this study, these estimates are inevitably approximate before detailed design studies are completed.

Funding: Appendix E also distributes the capital costs among various levels of government and private enterprise responsible for them in the development process. In doing so, the assumption is made that funds will be available in programs that apply to this development and which are existing law. No additional sources of public funding are assumed, but the level of funding in existing programs is taken to be adequate. Presumptious as this may be, a high level of funding is an essential condition for this kind of project. Furthermore, it seems very likely that prototypical development falling within the New Communities Act will receive preferential treatment in terms of federal funding.

The capital costs of each model are summarized and distributed by funding source in Table IV. An allowance of 20% is made to cover unexpected contingencies. This is twice the normal allowance for a project of this type. It is used here as a

TABLE IV (a)

NEW COMMUNITY. SUMMARY ESTIMATE OF CAPITAL COSTS BY FUNDING SOURCE. MODELS A, B.

($ millions 1969)

	Total	Public Devel. Corp.	Commun. Devel. Corp.	Federal	State	City	MDC	MBTA	Non-Profit Devel.	Developer	Other
Land	4.58		4.58								
Landfill											
Bridges	15.10		3.77	7.55	3.78						
Arterial Roads	10.50		2.62	5.25	2.63						
Local Roads	7.77		5.44	2.33							
Transit	17.18			11.34				5.84			
Other Mainland Links	1.00		0.25	0.50	0.25						
Water	2.80		0.84	1.96							
Sewer	3.07		0.92	2.15							
Electricity	4.12										4.12
Gas	1.10										1.10
Phone	1.00										1.00
Other											
Education	45.69				26.20	14.11			5.38		
Health	2.44			2.44							
Day Care	2.50			1.83	0.50				0.17		
Libraries	2.23			0.78		1.45					
Community Center	1.09		0.36	0.73							
Fire & Police	0.61					0.61					
Other	0.54			0.11		0.43					
Beaches	5.00			2.50			2.50				
Open Space	0.87		0.14	0.45					0.14	0.14	
Marinas	0.50		0.15	0.25						0.10	
Other	0.81		0.21	0.40			0.10		0.10		
Retailing	15.00									15.00	
Other Commercial	15.00									15.00	
Low-income hsg.	22.10								22.10		
Moderate-income hsg.	137.90								137.90		
Middle-income hsg.	78.60									78.60	
Total	399.10		19.28	40.57	33.36	16.60	2.60	5.84	165.79	108.84	6.22
Contingiencies @ 20%	79.60		3.85	8.14	6.66	3.32	0.52	1.17	33.50	21.78	1.25
Grand Total	478.70		23.13	48.71	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

TABLE IV (b)

NEW COMMUNITY. SUMMARY ESTIMATE OF CAPITAL COSTS BY FUNDING SOURCE. MODELS C,D

($ millions 1969)

	Total	Public Devel. Corp.	Commun. Devel. Corp.	Federal	State	City	MDC	MBTA	Non-Profit Devel.	Developer	Other
Land	4.58		4.58								
Landfill											
Bridges	15.10		3.77	7.55	3.78						
Arterial Roads	10.50		2.62	5.25	2.63						
Local Roads	5.18		3.63	1.55							
Transit											
Other Mainland Links	1.00		0.25	0.50	0.25						
Water	2.30		0.69	1.61							
Sewer	2.33		0.70	1.63							
Electricity	3.74										3.74
Gas	0.74										0.74
Phone	0.66										0.66
Other	27.42										
Education	√				16.04	8.64			2.74		
Health	1.45			1.45							
Day Care	1.50			1.10	0.30				0.10		
Libraries	1.17			0.41		0.76					
Community Center	0.66		0.22	0.44							
Fire & Police	0.31					0.31					
Other	0.38			0.08		0.30					
Beaches	5.00			2.50							
Open Space *	4.93		0.42	2.55			2.50		0.42	0.42	
Marinas	0.50		0.15	0.25			1.12			0.10	
Other	0.81		0.21	0.40					0.10		
Retailing	15.00	[illegible]					0.10			15.00	
Other Commercial	15.00									15.00	
Low-income hsg.	13.15	~ 20%							13.15		
Moderate-income hsg.	79.97	~ 50%							79.97		
Middle-income hsg.	48.72	~ 25%								48.72	
Total	262.10		17.24	27.27	23.00	10.01	3.72		96.48	79.24	5.14
CONTINGENCIES @ 20%	51.42		3.45	5.45	4.60	2.00	0.74	--	19.30	15.85	1.03

CHART I

DEVELOPMENT PHASING

```
               YEAR      -          1      2      3     4     5     6    7     8     9     10

Columbia Point   Site Development xxxxxxxxxxxxxx
                 Other Construction   xxxxxxxxxxxxxxxx

Thompson Island  Site Development xxxxxxxxxxxxxxxxxxxxxxxxxx
                 Other Construction            xxxxxxxxxxxxxxxxxxxxxxxxx

Spectacle Island Site Development              xxxxxxxxxxxxxxxxxxxxxxxxx
                 Other Construction                              xxxxxxxxxxxxxxxxxx

Long Island      Site Development                  xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
                 Other Construction                                   xxxxxxxxxxxxxxxxxxxxxxxxxx


Cumulative
  Population     % Total                  6.5    18.8  28.0  37.0  45.0 62.5  80.0  91.5   100
```

TABLE V (a)
CASH REQUIREMENT SCHEDULE.
TOTAL DEVELOPMENT. MODELS A, B
($ millions 1969)

YEARS:	1-10	1	2	3	4	5	6	7	8	9	10
Land	4.58	2.18	0.20	2.20							
Bridges	15.10	5.00	6.10	2.80	1.20						
Arterial Roads	10.50	1.80	2.20	2.85	1.90	1.00	0.75				
Local Roads	7.77	0.50	1.00	0.50	1.00	0.50	1.00	1.00	1.00	1.00	0.27
Transit	17.18	3.00	4.00	2.61	2.80	1.80	1.57	0.50	0.50	0.40	- -
Mainland Links	1.00	0.30	0.30	0.40							
Water	2.80	0.21	0.69	0.20	0.38	0.32	0.40	0.30	0.30		
Sewer	3.07	0.71	0.64	0.20	0.20	0.32	0.40	0.30	0.30		
Electricity,gas,phone	6.22	0.50	0.75	0.75	0.75	0.75	0.72	0.50	0.50	0.50	0.50
Gas											
Phone											
Other											
Education	45.69		1.00	5.00	5.00	1.00	5.50	7.00	13.00	7.00	1.19
Health	2.14		0.20	0.20	0.20	0.20	0.20	0.50	0.54	0.20	0.20
Day Care	2.50		0.20	0.30	0.50	0.20	0.20	0.60	0.20	0.10	0.20
Libraries	2.25						0.50	0.50	1.00	0.23	
Community Center	1.63							0.50	0.59	0.54	
Fire & Police	0.61			0.20				0.20		0.21	
Other											
Beaches	5.00			0.50	1.00	1.00	1.00	0.50	0.50	0.50	
Open Space	1.68		0.20	0.20		0.20	0.20	0.40	0.20	0.28	
Marinas	0.50					0.25				0.25	
Other											
Retailing											
Other Commercial											
Low-income hsg.											
Moderate-income hsg.											
Middle-income hsg.											
Total	130.50	14.20	17.48	18.91	14.93	7.54	12.44	12.80	18.63	11.21	2.36

TABLE V (b)
CASH REQUIREMENT SCHEDULE.
TOTAL DEVELOPMENT. MODELS C, D
($ millions 1969)

YEARS:	1-10	1	2	3	4	5	6	7	8	9	10
Land	4.58	2.18	0.20	2.20							
Landfill											
Bridges	15.10	5.00	6.10	2.80	1.20						
Arterial Roads	10.50	1.80	2.20	2.85	1.90	1.00	0.75				
Local Roads	5.18	0.33	0.67	0.33	0.67	0.33	0.67	0.67	0.67	0.66	0.18
Transit											
Mainland Links	1.00	0.30	0.30	0.40							
Water	2.30	.17	.57	.16	.31	.26	.33	.25	.25		
Sewer	2.33	.54	.49	.15	.25	.24	.30	.23	.23		
Electricity, gas,	6.22	0.50	0.75	0.75	0.75	0.75	0.72	0.50	0.50	0.50	0.50
xxx phone											
XXXXX											
Other											
Education	27.42		.60	3.00	3.00	0.60	3.30	4.20	7.80	4.20	0.72
Health	1.45		.12	.12	.12	.12	.12	.29	.32	.12	.12
Day Care	1.50		.12	.18	.30	.12	.12	.36	.12	.06	.12
Libraries	1.17						.12	.26	.53	.12	
Community Center	0.66						.26	.20	.24	.22	
Fire & Police	0.31			.10				.10		.11	
Other											
Beaches	5.00			0.50	1.00	1.00	1.00	0.50	0.50	0.50	
Open Space	5.74		.68	.68		.68	.68	1.37	.69	.96	
Marinas	0.50									0.25	
Other											
Retailing											
Other Commercial											
Low-income hsg.											
Moderate-income hsg.											
Middle-income hsg.											
Total	90.96	10.82	12.80	18.91	14.93	7.54	12.44	8.93	11.85	7.70	1.64

CASH REQUIREMENT SCHEDULE
COMMUNITY DEVELOPER. MODELS A, & B
(\$ millions 1969)

YEARS:	1-10	1	2	3	4	5	6	7	8	9	10
Land	4.58	2.18	0.20	2.20							
Landfill											
Bridges	3.77	1.25	1.52	0.70	0.30						
Arterial Roads	2.62	0.45	0.55	0.71	0.48	0.25	0.18				
Local Roads	5.44	0.50	1.00	0.50	0.75	0.50	0.50	0.50	0.50	0.44	0.25
Transit											
Mainland Links	0.25	0.08	0.07	0.10							
Water	0.84	0.06	0.21	0.06	0.11	0.10	0.12	0.09	0.09		
Sewer	0.92	0.21	0.18	0.06	0.06	0.10	0.12	0.10	0.09		
Electricity											
Gas											
Phone											
Other											
Education											
Health											
Day Care											
Libraries											
Community Center	0.36							0.11	0.13	0.12	
Fire & Police											
Other											
Beaches											
Open Space	0.35		0.04	0.04		0.04	0.05	0.08	0.04	0.06	
Marinas	0.15					0.08				0.07	
Other											
Retailing											
Other Commercial											
Low-income hsg.											
Moderate-income hsg.											
Middle-income hsg.											
Total	19.28	4.73	3.77	4.37	1.70	1.07	0.97	0.88	0.85	0.69	0.25
Planning & Admin.	5.00	0.75	0.75	0.50	0.50	0.50	0.50	0.50	0.50	0.25	0.25
Contingencies @ 20%	3.85	0.95	0.75	0.87	0.34	0.21	0.19	0.18	0.17	0.14	0.05
Grand Total	28.13	6.43	5.27	5.74	2.54	1.78	1.66	1.56	1.52	1.08	0.55

COMMUNITY DEVELOPER. MODELS C, & D
($ millions 1969)

YEARS:	1-10	1	2	3	4	5	6	7	8	9	10
Land	4.58	2.18	0.20	2.20				-			
Landfill											
Bridges	3.77	1.25	1.52	0.70	0.30						
Arterial Roads	2.62	0.45	0.55	0.71	0.48	0.25	0.18				
Local Roads	3.63	0.33	0.67	0.33	0.50	0.33	0.33	0.33	0.33	0.30	0.13
Transit											
Mainland Links	0.25	0.08	0.07	0.10							
Water	0.69	0.05	0.17	0.05	0.09	0.08	0.10	0.08	0.07		
Sewer	0.70	0.16	0.14	0.04	0.04	0.08	0.09	0.08	0.07		
Electricity											
Gas											
Phone											
Other											
Education											
Health											
Day Care											
Libraries											
Community Center	0.22							0.07	0.08	0.07	
Fire & Police											
Other											
Beaches											
Open Space	0.63		0.07	0.07		0.07	0.09	0.15	0.07	0.11	
Marinas	0.15					0.03				0.07	
Other											
Retailing											
Other Commercial											
Low-income hsg.											
Moderate-income hsg.											
Middle-income hsg.											
Total	17.24	4.50	3.39	4.20	1.41	0.89	0.79	0.71	0.62	0.55	0.18
Planning & Admin.	5.00	0.75	0.75	0.50	0.50	0.50	0.50	0.50	0.50	0.25	0.50
Contingencies @ 20%	3.45	0.90	0.68	0.84	0.28	0.18	0.16	0.14	0.12	0.11	0.04
Grand Total	25.69	6.15	4.82	5.54	2.19	1.57	1.45	1.35	1.24	0.91	0.47

TABLE VII (a)
CASH INCOME SCHEDULE. COMMUNITY DEVELOPER. MODEL A
($ millions 1969)

	YEARS: 1	2	3	4	5	6	7	8	9	10	1-10
Residential Land:											
Acres		21	41	22	22	34	39	39	29	25	272.0
Value		2.16	4.09	2.80	2.80	3.37	4.76	5.18	3.66	3.05	31.87
Commercial Land											
Acres		2	6	10	5	6	4	4	2	1	40.0
Value		0.20	0.60	1.00	0.50	0.60	0.40	0.40	0.20	0.10	4.00
Total Value		2.36	4.69	3.80	3.30	3.97	5.16	5.58	3.86	3.15	35.87

TABLE VII (b)

CASH INCOME SCHEDULE. COMMUNITY DEVELOPER. MODEL B

($ millions 1969)

YEARS	1	2	3	4	5	6	7	8	9	10	1-10
Residential Land-Value		2.37	4.43	3.16	3.16	3.63	5.32	5.92	4.11	3.43	35.53
Commercial Land											
Acres		2.0	6.0	10.0	5.0	6.0	4.0	4.0	2.0	1.0	40.0
Value		0.20	0.60	1.00	0.50	0.60	0.40	0.40	0.20	0.10	4.00
TOTAL VALUE		2.57	5.03	4.16	3.66	4.23	5.72	6.32	4.31	3.53	39.53

TABLE VII (c)
CASH INCOME SCHEDULE. COMMUNITY DEVELOPER. MODEL C
($ millions 1969)

1	2	3	4	5	6	7	8	9	10	1-10
Residential Land:										
Acres	12.3	24.0	12.9	12.9	19.9	23.0	23.2	17.1	14.7	160.0
Value	1.27	2.40	1.67	1.67	1.97	2.83	3.10	2.18	1.82	18.91
Commercial Land										
Acres	1.0	3.0	5.0	2.5	3.0	2.0	2	1	0.5	20.0
Value	0.10	0.30	0.50	0.25	0.30	0.20	0.20	0.10	0.05	2.00
Total Value	1.37	2.70	2.17	1.92	2.27	3.03	3.30	2.28	1.87	20.91

TABLE VII (d)
CASH INCOME SCHEDULE. COMMUNITY DEVELOPER. MODEL D
($ millions 1969)

YEARS	1	2	3	4	5	6	7	8	9	10	1-10
Residential Land-Value		1.40	2.62	1.87	1.87	2.15	3.15	3.50	2.43	2.03	21.02
Commercial Land Acres		1.0	3.0	5.0	2.50	3.0	2.0	2.0	1.0	0.5	20.0
Value		0.10	0.30	0.50	0.25	0.30	0.20	0.20	0.10	0.05	2.00
TOTAL VALUE		1.50	2.92	2.37	2.12	2.45	3.35	3.70	2.53	2.08	23.02

each year of the development process. This Cash Income Schedule is derived by combining the phasing plan of Chart I with the sales values estimated for land sold for housing and commercial development. These sales values are shown in Table VIII.

The figures shown in this table represent the most critical single set of assumptions in this analysis. They reflect the best judgment available at this stage in the study, but they must be considered preliminary estimates until a marketability study of this development is completed.

Cash Flow Analysis: The remaining step is to combine these flows of income and expenditure, and to apply an interest charge to the outstanding balance. This Cash Flow Analysis for the four development models is shown in Table IX. These figures are summarized in Chart II, illustrating both the timing and the magnitude of the Community Developer's financing needs, and the profit or loss he could expect to realize from the overall development of each of the four models.

The developer of Models A or B would experience a peak debt of around $12 million early in the development process. With a moderate to middle income population his final profit would be $3.4 million. With a middle to upper income population his profit would grow to $8.4 million.

ESTIMATED SALES VALUE OF DEVELOPMENT SITES
($ 1969)

	DENSITY (DU'S PER ACRE)	HIGH (120 PER ACRE)	MEDIUM (60 PER ACRE)	LOW (30 PER ACRE)
PUBLIC HOUSING				
(HOUSEHOLD INCOME $0-4,000)	PRICE/ACRE	$ 132,000.00	$ 90,000.00	$ 51,000.00
	PRICE/SQ.FT.	3.00	2.06	1.17
	PRICE/UNIT	1,100.00	1,500.00	1,700.00
MODERATE HOUSING (HOUSEHOLD INCOME $4,000-$7,000)	PRICE/ACRE	$ 216,000.00	$ 132,000.00	$ 72,000.00
	PRICE/SQ.FT.	4.95	3.00	1.65
	PRICE/UNIT	1,800.00	2,200.00	2,400.00
MARKET HOUSING (HOUSEHOLD INCOME $7,000-$13,000)	PRICE/ACRE	$ 300,000.00	$ 174,000.00	$ 93,000.00
	PRICE/SQ.FT.	6.90	4.00	2.14
	PRICE/UNIT	2,500.00	2,900.00	3,100.00
(HOUSEHOLD INCOME $13,000-$16,000)	PRICE/ACRE	$ 360,000.00	$ 204,000.00	$ 108,000.00
	PRICE/SQ.FT.	8.25	4.70	2.50
	PRICE/UNIT	3,000.00	3,400.00	3,600.00
(HOUSEHOLD INCOME $16,000-$20,000)	PRICE/ACRE	$ 396,000.00	$ 222,000.00	$ 123,000.00
	PRICE/SQ.FT.	9.10	5.10	2.80
	PRICE/UNIT	3,300.00	3,700.00	4,100.00
(HOUSEHOLD INCOME $20,000 +)	PRICE/ACRE	$ 420,000.00	$ 234,000.00	$ 129,000.00
	PRICE/SQ.FT.	9.60	5.40	3.00
	PRICE/UNIT	3,500.00	3,900.00	4,300.00
COMMERCIAL	PRICE/ACRE			$ 100,000.00
	PRICE/SQ.FT.			2.30

TABLE IX (a)
CASH FLOW ANALYSIS. COMMUNITY DEVELOPER. MODEL A
($ millions)

YEARS:

	1	2	3	4	5	6	7	8	9	10	1-10
Balance		6.88	10.47	12.33	11.84	11.04	9.34	6.14	2.23	(0.59)	
Cash Requirement Schedule	6.43	5.27	5.74	2.54	1.78	1.66	1.56	1.52	1.08	0.55	28.13
Cash Income Schedule	-	2.36	4.69	3.80	3.30	3.97	5.16	5.58	3.86	3.15	35.87
Debt or (Credit)	6.43	9.79	11.52	11.07	10.32	8.73	5.74	2.08	(0.55)	(3.19)	
Interest @ 7%	0.45	0.68	0.81	0.77	0.72	0.61	0.40	0.15	(0.04)	(0.22)	4.33
Net Cash Requirement or (Income)	6.88	10.47	12.33	11.84	11.04	9.34	6.14	2.23	(0.59)	(3.41)	(3.41)

TABLE IX (b)

CASH FLOW ANALYSIS. COMMUNITY DEVELOPER. MODEL B

($ MILLIONS)

YEARS:	1	2	3	4	5	6	7	8	9	10	1-10
Balance		6.88	10.25	11.73	10.82	9.57	7.49	3.56	(1.33)	(4.88)	
Cash Requirement Schedule	6.43	5.27	5.74	2.54	1.78	1.66	1.56	1.52	1.08	0.55	28.13
Cash Income Schedule		2.57	5.03	4.16	3.66	4.23	5.72	6.32	4.31	3.53	39.53
Debt or (Credit)	6.43	9.58	10.96	10.11	8.94	7.00	3.33	(1.24)	(4.56)	(7.86)	
Interest @ 7%	0.45	0.67	0.77	0.71	0.63	0.49	0.23	(0.09)	(0.32)	(0.55)	2.99
Net Cash Requirement or (Income)	6.88	10.25	11.73	10.82	9.57	7.49	3.56	(1.33)	(4.88)	(8.41)	(8.41)

TABLE IX (c)

CASH FLOW ANALYSIS. COMMUNITY DEVELOPER. MODEL C

($ MILLIONS)

	YEARS:										
	1	2	3	4	5	6	7	8	9	10	1-10
Balance		6.58	10.73	14.52	15.56	16.27	16.53	15.89	14.80	14.37	
Cash Requirement Schedule	6.15	4.82	5.54	2.19	1.57	1.45	1.35	1.24	0.91	0.47	25.69
Cash Income Schedule	-	1.37	2.70	2.17	1.92	2.27	3.03	3.30	2.28	1.87	20.91
Debt or (Credit)	6.15	10.03	13.57	14.54	15.21	15.45	14.85	13.83	13.43	12.97	
Interest @ 7%	0.43	0.70	0.95	1.02	1.06	1.08	1.04	0.97	0.94	0.91	9.10
Net Cash Requirement or (Income)	6.58	10.73	14.52	15.56	16.27	16.53	15.89	14.80	14.37	13.88	13.88

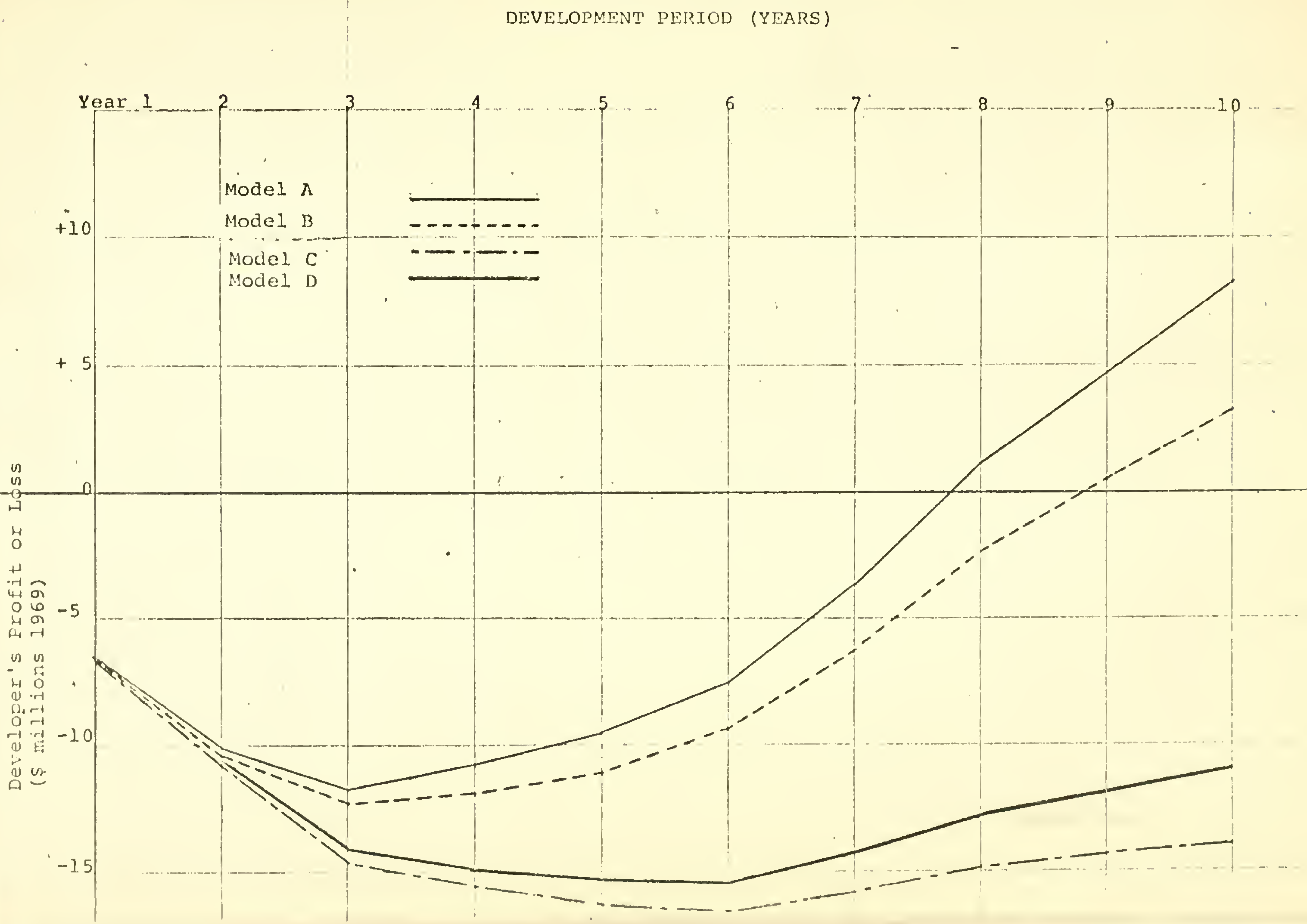
TABLE IX (d)

CASH FLOW ANALYSIS. COMMUNITY DEVELOPER. MODEL D

($ MILLIONS)

	YEARS:										
	1	2	3	4	5	6	7	8	9	10	1-10
Balance		6.58	10.59	14.13	14.93	15.39	15.40	14.34	12.71	11.87	
Cash Requirement Schedule	6.15	4.82	5.54	2.19	1.57	1.45	1.35	1.24	0.91	0.47	25.69
Cash Income Schedule		1.50	2.92	2.37	2.12	2.45	3.35	3.70	2.53	2.08	23.02
Debt or (Credit)	6.15	9.90	13.21	13.95	14.38	14.39	13.40	11.88	11.09	10.26	
Interest @ 7%	0.43	0.69	0.92	0.98	1.01	1.01	0.94	0.83	0.78	0.72	8.31
Net Cash Requirement or (Income)	6.58	10.59	14.13	14.93	15.39	15.40	14.34	12.71	11.87	10.98	10.98

CHART II
SUMMARY OF CASH FLOW ANALYSIS
MODELS A, B, C, D



A community with a smaller population would not fare so well under the funding mechanisms assumed. For Models C and D the peak debt would be larger, around $15 million, and would occur in the second half of the development process. The Developer of a community with a moderate to middle income population would reduce this loss to about $11 million.

Community Developer: The analysis of the financial feasibility of this development is complicated by two additional factors. The first is our uncertainty as to the nature of the Community Developer. Traditionally community developers in this country have been relatively small, undercapitalized concerns with a long-standing interest in real estate, either as merchant builder-developers, land speculators or mortgage bankers. To concerns such as these the pre-tax figures of cash-flow, debt requirement, risk capital and net profit on equity are of supreme importance.

More recently, however, a different kind of investor has entered this field, typified by the large conglomgerate looking for investment opportunities to employ excess cash funds while avoiding combinations that would create anti-trust problems. To this kind of investor the after-tax picture if of greatest interest. A high debt level, heavy financing costs and early capital losses take on a positive value if they can be used as

a tax write-off against other income. Such an investor could be concerned with stimulating sales for his other products, diversifying his interests, and gaining a prestige and advertising value from his investment, as well as securing a satisfactory cash return on his equity.

A third kind of developer potentially responsible for this New Community would be a Quasi-Public Community Development Corporation, set up by the city as a private corporation to develop this site in compliance with Title IV of the 1968 Act (New Communities). Such a corporation would not necessarily be interested in maximising cash profits. His goal may be to hold cash losses to an acceptable level, in exchange for other public benefits such as the provision of housing, jobs and recreation opportunities.

New Communities Act: In addition to this uncertainty surrounding the nature and the goals of the Community Developer, the financial picture is complicated by the Federal aid available through the New Communities Act. Under Title IV of this Act, the Federal Government will guarantee for each project up to $50 million in cash flow debentures at prevailing market interest rates. Unlike traditional mortgages, interest and principle payments on these debentures can be deferred until the later years

of the loan. This allows revenue from land sales to be used for further site development, rather than for immediate reduction of outstanding principal. The funds borrowed can be used to pay for land acquisition, utilities, roads, other site finishing costs, financing, planning and administration.

The amount of this loan is limited to 75% of appraised land value and 90% of other project costs. Equity requirements can be reduced, and even eliminated, if the land is appraised at higher than cost, and through a 10% non-cash builder's and sponsor's allowance for other expenses. Under these provisions not only can the Community Developer's cash equity be eliminated, but the Federal guarantee can assure that mortgage funds are available.

Federal approval of the loan is dependant upon a determination that the development is economically feasible, and that the project fulfills the public objectives outlined in the bill, namely, to:

1. Effect a general betterment of living conditions through the improved quality of a planned community including homes, commercial and industrial facilities, public and community facilities and open spaces;

2. Make a substantial contribution to the sound and economic growth of the areas in which they are located.
3. Provide needed additions to the general housing supply
4. Provide opportunities for innovation in housing, community development and land-use planning.
5. Enlarge housing and employment opportunities by increasing the range of housing choice and providing new investment opportunities for commerce and industry.
6. Encourage the maintenance and growth of a diversified local home building industry.

None of the models tested in this study conflict with these goals.

The final evaluation of the financial feasibility of this development must wait upon the resolution of the issues discussed above. Nevertheless, from an initial analysis, the prospect of development in Dorchester Bay looks favorable.

Summary

On the basis of the costs and revenues estimates of this study, the development of a community of 12,600 dwellings in

Dorchester Bay is a financially feasible undertaking, if a middle to upper income population can be accommodated.

The feasibility of developing a community of this same size but housing a moderate-middle income population is less certain; the before-tax profit estimated is probably too low to encourage speculative development unless a market analysis shows the demand for this development to be very high. On the other hand this model may suit the investment goals and the tax situation of corporate interests that are currently entering this investment field. In addition, a non-profit or limited-profit corporation could well undertake this development.

A cash loss is projected for the development of a community of 7,500 homes. But development on this reduced scale may have many advantages in terms of recreational use and political acceptability. If a funding mechanism can be devised to allow an additional city, state or federal subsidy to compensate for this cash loss, such an alternative may be judged, on balance, to be the superior option facing the city.

VI

NEXT STEPS

FEEDBACK

The purpose of the study to date has been to clarify the feasible options open to the City in Dorchester Bay, and to estimate the major benefits and costs associated with a wide range of alternative development possibilities. The objective of this initial part of the study is the selection of a more limited target towards which an expanded study can be directed. Various alternative options have been presented. Which, if any, merits intensive study? Which elements of either model should be stressed, and which should be minimized? Is some feasible alternative entirely outside the present scope of this analysis? This policy feedback is essential to stabilize and focus the future direction of the study.

Two kinds of activity, implementation studies and planning studies, will be needed to achieve the goal of a new community proposal by February 1970. Given the nature of this deadline, relating to time-table of the General Court, it is appropriate that the implementation analysis, including legal, legislative

and community relations studies receive the highest priority. While the planning studies undertaken so far could form a basis for a planning proposal, these implementation studies have received little attention to date.

A. Implementation Studies

These studies are not so much concerned with the nature of the development to be recommended for Dorchester Bay, as with the process of implementing this development successfully. Needless to say the implementation process selected is an important determinant of the plan, and vice versa.

Legal and Legislative Studies

The overall purpose of these studies is to outline and evaluate alternative legal, legislative and institutional strategies designed to carry out the planning, funding, development and operation of a new community, followed by the dissolution of the development body, and the delivery of the community into the political, administration and service system of the city.

Component studies needed:

a. A survey of the existing political, legal and institutional constraints on the development of a new community by the city on this site, with special emphasis on

the applicability of Chapter 121A to the effectuation of this development.

b. An analysis of the structure, the powers and privileges needed by a developing institution undertaking such a new community with special reference to its powers in raising private capital, contracting for government funding, and disposing of profits.

c. Outline the legal and legislative action the City must take to make the site available for development and to set-up or engage the development institution described above.

d. Outline the legal and legislative action to allow the State to set up an urban development corporation capable of implementing this development.

e. Outline the relationship of this development institution to the City, specifying the areas of independent descision-making, and areas over which the City retains veto-power or positive direction.

f. Outline the relationship of the development institution to other levels of government, relevant regulatory authorities, and to local community interest groups.

g. Outline the relationship of the Development institution to the incoming resident groups at each stage in the development process, proposing a means of transferring authority as the development activity terminates.

h. Outline the relationship of the new community to the political, administrative and fiscal structure of the city and the Metropolitan area, at each stage in the development process.

Development Studies

a. Analyse the feasibility of this development from the point of view of alternative development interests.

b. Study the timing, phasing, and subcontracting problems needed to disaggregate the community into developable units.

c. Outline the kind of planning controls and level of flexibility a developer would find acceptable in undertaking this project.

d. Construct a financial model for the planning, programming, marketing and budgeting control of this development.

Community Relations Studies

Perhaps the most prominent aspect of any development proposal for the Harbor Islands is the probability of political

opposition from many quarters. These studies should lay the groundwork for a solution to this problem, surveying the attitudes of individuals and institutions with an important stake in the Harbor, gaining the support and confidence of these groups, and recommending changes in the plan and implementation process that will justify this support.

In view of the city's support for the Expo Boston 76, and the uncertain future of this proposal, this study should be conducted with discretion. At this stage it should be restricted to a limited number of key elected officials and community people.

This study could be structured in five stages:

1. Analysis of the New Community proposals in terms of their strengths and weaknesses in the eyes of the community in general and specific interest groups in particular.
2. Selection of a limited audience for preliminary discussions of the proposals. This audience should include a) individuals whose backing will encourage the support of a wider audience in later disucssions. b) individuals whose reaction to the proposals will indicate the future reaction of a wider audience. c) elected representatives from adjacent districts

in Boston. d) key state legislators, officials and commission members.

3. Preparation and presentation of proposals to this audience.
4. Analysis of feedback
   - a. Elements of proposals supported
   - b. Elements of proposals opposed
   - c. Reactions to proposals in terms of city-wide development tradeoffs.
   - d. Implications of feedback on the New Community development and implementation process
5. Planning for next phase of Community Relations Study with a wider audience.

Marketability Studies

Although some effort has been made to assess the marketability of different kinds of development on this site, this element of the study needs reinforcement. One critical element in this analysis is the effect of aircraft noise on the marketing of housing and commercial development on this site.

B. Planning Studies

In addition to generalized land-use, transportation, and recreation planning and preliminary design studies, three important planning and technical studies are required.

a. Bridge and Causeway engineering. This study should test the feasibility of linking the islands with bridges and causeways at an acceptable cost. This will require some seismic survey work and outline engineering studies.

b. Pollution and Ecology. The effects of these links and any landfill around the islands on pollution and ecological conditions should be assessed at this stage in the study. This work is underway at MIT.

c. City-wide impact. The effects of this development on the population, housing stock, job market and fiscal problems of Boston as a whole have received only superficial study so far. The great potential of this development as a relocation resource to be linked with other housing, job producing or tax generating development programs has not been explored in any depth. These are important aspects of the problem that need to be studied and evaluated before planning studies for the community itself are undertaken in any detail.

These general planning studies can continue to use the kind of analysis presented in this report; namely, the formulation of

alternative proposals that will present themselves in each functional component of the plan, the evaluation of the costs and benefits of each alternative, and an analysis of the feasibility of each given the constraints revealed by the implementation studies outlined above. The functional components of the community that will require some detailed planning studies are land-use, transportation, recreation, plus community and commercial facilities. In addition some preliminary urban design studies may be needed to support the marketability analysis.

POPULATION AND HOUSING MODEL A

1. Total Model population is 42,240 (3.4 people/unit; 25 units/gross acre)

2. Income distribution and family size-Model A.

FAMILY INCOME ($000's)	% TOTAL	NUMBER OF FAMILIES	PERSONS/FAMILY 1--2	3--4	5--6	7+
0--4	10	1260	504	252	252	252
4--7	30	3780	1008	1638	882	252
7--10	30	3780	882	1890	882	126
10--14	20	2520	1260	882	378	-
14 +	10	1260	756	378	126	-
Total	100	12600	4410	5040	2520	630

These figures do not include the low-income population of Columbia Point Housing Project (6,118 people in 1,456 dwellings).

3. LAND USE MODEL A

Residential	-	270 Acres
Commercial	-	40 Acres
Employment	-	25 Acres
Transportation	-	50 Acres
Community Facilities		50 Acres
Open Space Recreation		115 Acres
Total		550 Acres

4. FAMILY INCOME AND DENSITY MODEL A

FAMILY INCOME ($000's)	UNITS	DENSITY HIGH 120/ACRE	MEDIUM 60/ACRE	LOW 30/ACRE
0--4	1260	336	384	540
4--7	3780	1008	1052	1620
7--10	3780	1008	1052	1620
10--14	2520	672	768	1080
14 +	1260	336	384	540
Total	12600	3360	3640	5400

5. ISLAND POPULATION DENSITY MODEL A

	TOTAL ACRES	RESIDENTIAL ACRES	TOTAL UNITS	HIGH DENSITY		MEDIUM DENSITY		LOW DENSITY		
				ACRES	UNITS	ACRES	UNITS	ACRES	UNITS	POPULATION
Columbia Point	50	42	1620	0	0	12	720	30	900	5500
Thompson	157	84	3720	8	960	16	960	60	1800	12650
Spectacle	80	46	2340	8	960	8	480	30	900	7950
Long	213	100	4920	12	1440	28	1680	60	1800	16750
Landfill	50	-	-	-	-	-	-	-	-	-
Total	550	300	12600	28	3360	64	3840	180	5400	42240

ISLAND HOUSEHOLD INCOME DISTRIBUTION MODEL A

INCOME $000's

	0-4	4-7	7-10	10-14	14+	Total
Columbia Point	162	486	486	324	162	1620
High density	0	0	0	0	0	0
Medium density	72	216	216	144	72	720
Low density	90	270	270	180	90	900
Thompson	372	1116	1116	744	372	3720
High density	96	288	288	192	96	960
Medium density	96	288	288	192	96	960
Low density	180	540	540	360	180	1800
Spectacle	234	702	702	468	234	2340
High density	96	288	288	192	96	960
Medium density	48	144	144	96	48	480
Low density	90	270	270	180	90	900
Long Island	492	1476	1476	984	492	4920
High density	144	432	432	288	144	1440
Medium density	168	504	504	336	168	1680
Low density	180	540	540	360	180	1800

EMPLOYMENT SUMMARY MODEL A

a. Locally generated employment

Category	Projected Jobs	Estimated Range
Construction	420	
Manufacturing	0	
Transportation	460	
Communications, Utility Services	420	
Wholesale	380	
Eat and Drink	380	
Retail	120	
Bus. and Repair Services	120	
Private Households	80	
Personal Services	200	
Hospital Services	500	
Educational Services	1000	
Professional Services	170	
Public Administration	420	
Other	210	
Subtotal	5860	4500-6000

b. Externally generated employment

Category	Projected Jobs	Estimated Range
U. Mass./Boston	2600	2000-2600
Business Service, R & D, Medical, Training, F.I.R.E.	7500	5000-7500
Subtotal	10,100	
TOTAL	15,960	11,500-16,100

APPENDIX B

POPULATION AND HOUSING MODEL B

1. Total Model population is 42,240 (3.4 people/unit; 25 units/gross acre)

2. Income distribution and family size Model B.

FAMILY INCOME ($000's)	% TOTAL	NUMBER OF FAMILIES	PERSONS/FAMILY			
			1--2	3--4	5--6	7+
0--4	10	1260	504	252	252	252
4--7	20	2520	680	1085	589	166
7--10	20	2520	588	1260	588	84
10--13	20	2520	1260	882	378	--
13--16	15	1890	1132	566	192	--
16--20	10	1260	756	378	126	--
20+	5	630	378	189	63	--
Total	100	12600	5298	4612	2188	502

These figures do not include the low-income population of Columbia Point Housing Project (6,118 people in 1,456 dwellings).

3. LAND USE MODEL B

Residential	-	270 Acres
Commercial	-	40 Acres
Employment	-	25 Acres
Transportation	-	50 Acres
Community Facilities		50 Acres
Open Space Recreation		115 Acres
Total		550 Acres

4. FAMILY INCOME AND DENSITY MODEL B

FAMILY INCOME ($000's)	UNITS	HIGH 120/ACRE	MEDIUM 60/ACRE	LOW 30/ACRE
0--4	1260	336	384	540
4--7	2520	630	755	1135
7--10	2520	630	755	1135
10--13	2520	755	755	1010
13--16	1890	566	566	758
16-20	1260	378	378	504
20+	630	189	189	252
TOTAL	12600	3360	3782	5400

5. ISLAND POPULATION DENSITY MODEL B

	TOTAL ACRES	RESIDENTIAL ACRES	TOTAL UNITS	HIGH DENSITY		MEDIUM DENSITY		LOW DENSITY		POPULATION
				ACRES	UNITS	ACRES	UNITS	ACRES	UNITS	
COLUMBIA POINT	50	42	1620	0	0	12	720	30	900	5500
THOMPSON	157	84	3720	8	960	16	960	60	1800	12650
SPECTACLE	80	46	2340	8	960	8	480	30	900	7950
LONG	213	100	4920	12	1440	28	1680	60	1800	16750
LANDFILL	50	-	-	-	-	-	-	-	-	-
TOTAL	550	270	12600	29	3484	63	3782	178	5334	42240

6. ISLAND HOUSEHOLD INCOME DISTRIBUTION MODEL B

INCOME $000's

	0-4	4-7	7-10	10-13	13-16	16-20	20+	TOTAL
COLUMBIA POINT	162	322	322	324	242	162	86	1620
High Density	0	0	0	0	0	0	0	0
Medium Density	72	144	144	144	108	72	36	720
Low Density	90	178	178	180	134	90	50	900
THOMPSON	372	743	743	744	558	372	188	3720
High Density	96	192	192	192	144	96	48	960
Medium Density	96	192	192	192	144	96	48	960
Low Density	180	359	359	360	270	180	92	1800
SPECTACLE	234	469	469	468	352	234	114	2340
High Density	96	193	193	192	144	96	46	960
Medium Density	48	96	96	96	72	48	24	480
Low Density	90	180	180	180	136	90	44	900
LONG ISLAND	492	986	986	984	738	492	242	4920
High Density	144	288	288	288	216	144	72	1440
Medium Density	168	336	336	336	252	168	84	1680
Low Density	180	362	362	360	270	180	86	1800
TOTAL	1260	2520	2520	2520	1890	1260	630	12600

7. EMPLOYMENT SUMMARY: MODEL B

As for Model A. See Appendix A.

APPENDIX C

NEW COMMUNITY DEVELOPMENT MODEL C

25,000 population

POPULATION AND HOUSING MODEL C

1. Total Model population is 25,000 (3.4 people/units; 7,500 units; 13.6 units/gross acre).

2. Income Distribution and Family Size Model C.

FAMILY INCOME ($000's)	% TOTAL	NUMBER OF FAMILIES	PERSONS/FAMILY 1--2	3--4	5--6	7+
0--4	10	750	300	150	150	150
4--7	30	2250	600	975	525	150
7--10	30	2250	525	1125	525	75
10--14	20	1500	750	525	225	-
14+	10	750	450	225	75	-
TOTAL	100	7500	2675	3000	1500	375

These figures do not include the low-income population of Columbia Point Housing Project (6,118 people in 1,456 dwellings).

3. LAND USE MODEL C

Residential	-	160 Acres
Commercial	-	20 Acres
Employment	-	20 Acres
Transportation	-	50 Acres
Community Facilities	-	30 Acres
Open Space Recreation	-	270 Acres
Total		550 Acres

4. FAMILY INCOME AND DENSITY MODEL C.

FAMILY INCOME ($000's)	UNITS	% UNITS	HIGH 120/ACRE	% UNITS	MEDIUM 60/ACRE	% UNITS	LOW 30/ACRE
0--4	750	40%	300	30%	225	30%	225
4--7	2250	25%	560	30%	675	45%	1015
7--10	2250	25%	560	30%	675	45%	1015
10--14	1500	30%	450	30%	450	40%	600
14+	750	30%	230	30%	225	40%	295
TOTAL	7500		2100		2250		3150
Acres	160		17.5		37.5		105.0

5. ISLAND POPULATION DENSITY MODEL C

	TOTAL ACRES	RESIDENTIAL ACRES	TOTAL UNITS	HIGH DENSITY		MEDIUM DENSITY		LOW DENSITY		POPULATION
				ACRES	UNITS	ACRES	UNITS	ACRES	UNITS	
Columbia Point	50	20	750	0	0	5	300	15	450	2500
Thompson	157	50	2250	5	600	10	600	35	1050	7500
Spectacle	80	30	1500	5	600	5	300	20	600	5000
Long	213	60	3000	7.5	900	17.5	1050	35	1050	10,000
Landfill	50	-	-	-	-	-	-	-	-	-
Total	550	160	7500	17.5	2100	37.5	2250	105	3150	25,000

6. ISLAND HOUSEHOLD INCOME DISTRIBUTION MODEL C

	INCOME $000's					
	0-4	4-7	7-10	10-14	14+	Total
Columbia Point	75	225	225	150	75	750
High density	0	0	0	0	0	0
Medium density	30	90	90	60	30	300
Low density	45	135	135	90	45	450
Thompson	225	675	675	450	225	2250
High density	60	180	180	120	60	600
Medium density	60	180	180	120	60	600
Low density	105	315	315	210	105	1050
Spectacle	150	450	450	300	150	1500
High density	60	180	180	120	60	600
Medium density	30	90	90	60	30	300
Low density	60	180	180	120	60	600
Long Island	300	900	900	600	300	3000
High density	90	270	270	180	90	900
Medium density	105	315	315	210	105	1050
Low density	105	315	315	210	105	1050

EMPLOYMENT SUMMARY MODEL C

Locally generated employment

Category	Projected Jobs	Estimated Range
Construction	250	
Manufacturing	0	
Transportation	275	
Communications, Utility Services	250	
Wholesale	225	
Eat and Drink	225	
Retail	500	
Bus. and Repair Services	75	
Private Households	50	
Personal Services	125	
Hospital Services	300	
Educational Services	600	
Professional Services	100	
Public Administration	250	
Other	125	
Subtotal	3350	2500-4000

Externally generated employment

U. Mass./Boston	2600	2000-2600
Business Service, R & D, Medical, Training, F.I.R.E.	5000	3500-6000
Subtotal	7600	
TOTAL	10,950	8000-12,600

APPENDIX D

POPULATION AND HOUSING MODEL D

1. Total Model D population is 25,000 (3.4 people/unit; 7,500 units; 13.6 units/gross acre).

2. Income Distrubution and Family Size Model D.

FAMILY INCOME ($000's)	% TOTAL	NUMBER OF FAMILIES	PERSONS/FAMILY 1--2	3--4	5--6	7+
0--4	10	750	300	150	150	150
4--7	20	1500	400	650	350	100
7--10	20	1500	350	750	350	50
10--13	20	1500	750	525	225	-
13--16	15	1125	675	337	113	-
16--20	10	750	450	225	75	-
20+	5	375	225	113	37	-
Total	100	7500	3150	2750	1300	300

These figures do not include the low-income population of Columbia Point Housing Project (6,118 people in 1,456 dwellings.)

3. LAND USE MODEL D

Residential	-	160 Acres
Commercial	-	20 Acres
Employment	-	20 Acres
Transportation	-	50 Acres
Community Facilities	-	30 Acres
Open Space Recreation	-	270 Acres
Total		550 Acres

4. FAMILY INCOME AND DENSITY MODEL D

FAMILY INCOME ($000's)	UNITS	HIGH 120/ACRE	MEDIUM 60/ACRE	LOW 30/ACRE
0--4	750	200	230	320
4--7	1500	375	450	675
7--10	1500	375	450	675
10--13	1500	450	450	600
13--16	1125	337	338	450
16--20	750	225	225	300
20+	375	112	113	150
Total	7500	2074	2256	3170

5. ISLAND POPULATION DENSITY MODEL D

AS FOR MODEL C. SEE APPENDIX C1

6. ISLAND HOUSEHOLD INCOME DISTRIBUTION MODEL D

	INCOME $000's							
	0-4	4-7	7-10	10-13	13-16	16-20	20+	TOTAL
COLUMBIA POINT	75	150	150	150	112	75	38	750
High Density	0	0	0	0	0	0	0	0
Medium Density	30	68	68	68	50	30	15	329
Low Density	45	82	82	82	62	45	23	421
THOMPSON	225	450	450	450	338	225	112	2250
High Density	60	115	115	115	87	60	30	582
Medium Density	60	115	115	115	87	60	30	582
Low Density	105	220	220	220	164	105	52	1086
SPECTACLE	150	300	300	300	225	150	75	1500
High Density	60	123	123	123	92	60	30	611
Medium Density	30	62	62	62	46	30	15	307
Low Density	60	115	115	115	87	60	30	582
LONG ISLAND	300	600	600	600	450	300	150	3000
High Density	90	176	176	176	132	90	45	885
Medium Density	105	205	205	205	154	105	52	1031
Low Density	105	219	219	219	164	105	53	1084
TOTAL	750	1500	1500	1500	1125	750	375	7500

7. EMPLOYMENT SUMMARY MODEL D

AS FOR MODEL C. SEE APPENDIX C

ROUGH BENEFIT-COST ANALYSIS OF ALTERNATIVE STRATEGIES FOR DEVELOPING A SITE FOR A NEW COMMUNITY IN DORCHESTER BAY

Two strategies for developing the land and water areas of Dorchester Bay are compared in this analysis:

Plan "A"	Reserve the islands for recreation; create new land by fill and platforms for urban development in the water area of the harbor. This is similar to the strategy proposed by the Expo plan.
Plan "B"	Reserve the water areas of the harbor, and the beach areas of the islands and mainland for recreation; provide access and develop the remainder of the existing land areas for urban use.

In essence, these strategies differ in only two respects; first in the cost incurred in providing accessible land; and second in the benefits attributed to the recreation/conservation use of the harbor islands. If we know the costs estimated for the first factor, we can proceed to deduce the second as follows:

As we shall see, the land in Plan "A" would cost more than the land in Plan "B". If we assume that .

a) Plan "A" is at least as sound an investment of public resources as Plan "B", then we must also assume that;

b) The additional recreational benefits of Plan "A" equal or exceed the added cost of this strategy.

If, on analysis, assumption b) proves incorrect, the same judgement must apply to assumption a) That is the logic underlying this analysis.

Costs

The land in Plan "A" would cost some $295,000 per acre more than the land in Plan "B" (See below). In addition it incurs an "opportunity cost" by sacrificing the chance to develop existing land. If we limit the extent of this opportunity cost to the increase in land value foregone, and for the sake of simplicity ignore all the remaining benefits and revenues flowing from development, we can establish an approximate opportunity cost carried by Plan "A" of some $45,000 per acre.

Assuming favorable financing with an interest rate of over 20 years of say 5%, the excess in the carrying costs of Plan "A" over Plan "B" amounts to some $17,200 per acre per year, or say $8 million for the full acreage of the islands.

Benefits

Are the recreational advantages of Plan "A" worth $8 million a year more than those of Plan "B"? Although no satisfactory technique has been devised for measuring the dollar value of recreation, Ruth Mack and Sumner Myers analyze three independent studies, each of which derives an approximate value for outdoor recreation of 30-35 cents per person per hour.[1] This would amount to about $2 per person per day. If we take this value as a lower bound, a range of $2 - $5 per person per day for the value of recreational use in the harbor both reasonable, generous and adequately precise for our purposes.

The harbor park will be used intensively over say 100 summer days. In order to justify the cost of Plan "A" we must therefore expect that 16,000 - 40,000 people will be present on an average day -- in addition to the number who would use the recreation facilities provided by Plan "B".

How do the recreation facilities of the two plans differ? Plan "A" provides some 450 acres of islands for recreation, but sacrifices 350 acres of water. Plan "B", on the other hand, would reserve at a minimum 100 acres of the island shoreline for recreation use, and would avoid building over water areas. For the sake of analytical simplicity, let us discount the recreation/conservation value of the water areas, that is their boating, fishing, swimming and aesthetic potential, and concentrate solely on the differences in the land recreation of the two plans. Because the 100 acres provided by Plan "B" would consist of the choicest shoreline areas, and because of the proximity of these areas to transportation and urban redevelopment, we can assume a higher density of recreational use in Plan "B" than in Plan "A". If we assumed that at say 10 people to the gross acre 4,000 people might use the recreation facilities of Plan "A" on an average summer day, while at 20 persons per acre 2,000 people might use Plan "B", the difference of 2,000 people per day fails to approach the 16,000 - 40,000 required. In fact, at this level of recreational use, we would have to assume a value for this recreation of $40 per person per day to justify the additional costs of Plan "A".

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[1] In "Measuring the Benefits of Government Investment," Robert Borfman ed., Brookings Institute, 1965.

In order to bring this figure down to reasonable levels, we would have to accept vastly increased densities of recreation use. Even assuming that both plans are used for recreation at the same density, we would have to assume 115 people per acre in order to reach the figure of $2 per person/day, or 40 people per acre to reach the $5 per person/day. These are densities per gross acre on an average day; along the beaches the crowding would be considerable, probably on the order of 50-100 people per acre. At these densities it is questionable whether a day spent outdoors is worth even $2 per person per day.

It is no less questionable that a demand exists for recreation facilities on the islands to accommodate up to 8% of the city's population on an average summer day.

Summary

This analysis is admittedly crude and approximate, but the factors in question do not lend themselves to precise quantification. Nevertheless, the discrepancy between the reasonable values suggested for recreation, $2 - $5 a day, and the value of $40 a day necessary to justify Plan "A" at a reasonable density of use, is so large that analytical precision is obviously not the major problem at hand.

Crude as it is, this analysis suggests that a strategy of creating new land in the harbor, while preserving the islands undeveloped, incurs costs that cannot easily be justified in terms of the recreational use of Dorchester Bay. To follow such a strategy and to accept that an enormous public subsidy is a valid expense required to ensure the exclusive recreational use of the islands may, in the final analysis, be judged worthwhile. But it is important, first, to know that such a subsidy is necessary, and, second, to know the rough magnitude of the sum involved. It may well be that a more optimal use of these resources can be devised, using other strategies to provide recreation facilities for the city's population, or directing these resources toward solutions to other more pressing problems faced by the New Community or the city at large. In this study, the latter is assumed to be the case.

Derivation of Costs

1.	Cost of raw land and access in Plan "A"[1]	$350,000/acre
2.	Cost of raw land and access in Plan "B"[2]	$ 55,000/acre
3.	Difference in cost per acre	$295,000
4.	Carrying cost of (3) @ 5%, over 20 years	$15,000/year
5.	Opportunity cost of Plan "A"[3]	$45,000/acre
6.	Carrying cost of (5) @ 5%, over 20 years	$ 2,200/acre
7.	Total annual difference in carrying costs	$17,200/acre
8.	Annual difference in carrying cost over 450 acres of island	$ 7,750,000
	Say	$ 8 million

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[1] 270 acres of landfill @ $160,000/acre; 60,000 ft. of Dykes @ $350/ft.; 80 acres of platforms @ $760,000/acre (ADL estimates for EXPO Boston). No allowance for contingencies, fees, etc. Cost of bridge to Thompson Island discounted.

[2] Acquisition of Spectacle Island, say $1 million. Long Island publically owned. Thompson Island common to both plans, therefore discounted. Bridge and causeway links-17 million dollars. (See Appendix H) Allow $7 million for contingencies, etc. Total $125 million over 450 acres.

[3] Assume that development of harbor islands would increase their land values from say $1-$2 per square foot. Discounts all other revenues and benefits from development.

APPENDIX F

EMPLOYMENT AND ECONOMIC ACTIVITY

On the basis of labor force participation rates for Boston, a New Community population of 42,000 (Models A and B) would generate a labor force of 16,350 workers, with 11,000 men and 5,350 women. For a population of 25,000 (Models C and D) there would be 9,750 workers, 6,550 men and 3,200 women. This labor force will find employment both in the New Community and in the city or region at large. Conversely, workers living elsewhere in Boston will commute to the site to take jobs serving the Community population and to take employment in other firms that may choose to locate within the New Community.

Thus, we are concerned with estimating two kinds of employment; that generated locally; and that locating on the site, but generated elsewhere in the region. A reasonably close fit between jobs and labor force in many ways an advantage, but considerable cross-commutation is both inevitable and a desirable stimulus for the community.

Locally Generated Employment

The population of the New Community can be expected to generate jobs and economic activity somewhere in the Boston region in numbers sufficient to support its needs. The quantity and quality of the economic activity within the site area itself will depend on the size of the community and its functional relationship to the rest of Boston.

It will be influenced by the income structure of the population and other special characteristics discussed below.

To assess the extent of this economic activity, we can look at the number of jobs generated in the past by the population of Boston and the Region. This gives a guide to the probable job requirements of the New Community. Some of this activity can be accommodated locally. The remainder will locate elsewhere, notably in downtown Boston. The known pattern of job distribution in Boston can be used as a guide to split the jobs required to fill the needs of the community population between those provided on site, and those provided elsewhere.

The level of employment generated by each 1,000 population in the City of Boston and in the SMSA is illustrated by Table X, in Columns A and B respectively. In Columns C and D these data are adjusted to distribute that part of the workforce that failed to report its occupation.

Generally speaking, the New Community is expected to resemble the City of Boston in its employment characteristics more closely than the SMSA. But in many ways the employment structure of the inner city is affected by its downtown functions in a way that makes direct comparison with the New Community misleading. This would be the case, for instance, with Public Administration, or Eating and Drinking establishments. The levels of employment set out in Column E represent a "City-SMSA Benchmark" taken to be comparable to the likely performance of the New Community population in generating jobs and economic activity.

TABLE X

CITY AND REGIONAL EMPLOYMENT BREAKDOWN BY JOB CATEGORY

	CITY: Emp./ 1,000 pop. Unadjusted A	SMSA: Emp./ 1,000 pop. Unadjusted B	CITY: Emp./ 1,000 pop. Adjusted C	SMSA: Emp./ 1,000 pop. Adjusted D	CITY-SMSA Benchmark Emp./1,00 Population E
struction	18	20	19	22	19
ufacture	101	114	109	124	109
road	4	3	4	3	3
er Transportation	17	12	19	13	13
munity and Utility Services	12	12	13	13	13
lesale	17	16	19	19	19
and Drink	15	11	16	12	12
il	45	47	47	52	47
and Rep. Services	11	11	12	12	12
vate Households	6	7	6	7	6
. Service	16	11	17	13	13
pital Service	21	14	23	15	15
ational Service	20	25	22	27	27
fessional Service	20	21	22	23	22
lic Administration	28	22	31	24	24
r	29	19	32	21	25
Reported	33	32	0	0	---

Source: 1960 Census

Although this "Benchmark" level of employment may adequately describe the level and structure of the economic activity required to support the population, not all of this employment will be provided locally, within the Community. As an integral part of Boston, the New Community will be dependent on downtown for many economic functions; heavily dependent for some functions, such as Business Services; less dependent for others, such as Personal Services. Although the basic structure of this pattern is dictated by more or less inflexible economic factors, to some degree it can be modified by a policy of stimulating economic activity within the New Community.

However, in the absence of such a policy the employment generated by the New Community population would be split between local jobs and downtown jobs, in a pattern that roughly approximates that of similar communities in Boston. Table XI sets out the number of jobs per thousand population located in existing communities of Boston. On the right hand side of the Table, these data are presented as percentages of the "City-SMSA Benchmark" levels derived in Table X.

In estimating local employment in the New Community, comparable areas in the City are used as a yardstick. For Local Services and Retail Employment the non-downtown areas of Boston are are used as the standard. (For these purposes, downtown is defined as the Business Center of Central Boston, and the Institutional Center of Parker-Hill/Fenway).

TABLE XI

DISTRIBUTION OF EMPLOYMENT BY DISTRICT IN BOSTON

	Jobs per 1,000 Population			Percent of Benchmark		
Area	Manuf. and Other	Retail	Services	Manuf. and Other	Retail	Services
y-SMSA Benchmark	201	59	119	100%	100%	100%
ntown	993	334	992	490%	570%	834%
-Downtown	191	28	32	95%	47%	27%
tral Boston	1,424	454	1,253	708%	769%	1,053%
ker-Hill nway	232	123	521	115%	227%	443%
rlestown	545	13	26	271%	22%	22%
t Boston	158	11	40	79%	19%	34%
th Boston	534	81	33	266%	137%	28%
bury	127	24	34	63%	41%	29%
chester	91	17	23	45%	29%	19%
lindale	27	25	17	13%	42%	14%
t Roxbury	44	41	14	22%	69%	12%
e Park	136	18	15	68%	31%	13%
aica Plain	81	9	49	40%	15%	33%
ghton	168	42	66	84%	71%	55%
posed New mmunity	120	35	60	60%	60%	50%

ce: MAPC 1963 data

As a yardstick for local blue-collar employment, however, the non-downtown average is heavily biased by the unusually large industrial employment of Charlestown and South Boston. These two areas increase the local blue-collar employment of the non-downtown from 53% of "Benchmark" to 95%. It is probably the former figure that more realistically reflects the local employment potential for blue-collar employment in the New Community. On the basis of these data, we can expect that about 50% of "Benchmark" retail employment, and 30% of the "Benchmark" service employment would be provided within the local community served by these jobs. With a policy to enhance the "urbanity" and "vitality" of the New Community by increasing the level of local employment, these proportions of "Benchmark" employment to be accommodated locally can probably be increased to 60% for blue-collar and retail employment, and 50% for service employment. The following analysis assumes that such a policy is adopted. Due to factors discussed below, it is unlikely that this policy could be successfully implemented with respect to manufacturing. This component has therefore been eliminated. Table XII distributed these proportions of "Benchmark" blue-collar, retail and service employment among the finer categories of employment used in Table V. Some discretion is used in distributing the 50% of "Benchmark" service employment among categories that differ as widely as Hospital Services to Professional Services. Of the former, 90% could be provided

locally; of the latter, perhaps 20%.

a. In the case of Blue-collar category, we have assumed that a greater proportion of "Benchmark" jobs will be provided locally in Other Transportation, and Communications and Utility Services, than in Construction, Railroad, and Wholesale. These assumptions are made on the basis of access and density considerations.

b. In retail employment, we assume that a higher proportion of "Benchmark" jobs in Eating and Drinking places will be provided locally than in Other Retail, much of which is less oriented to a local market.

c. In the service category, we assume that almost all of "Benchmark" Hospital Service and Educational Service employment can be provided locally, while most of Business and Professional Services jobs will remain downtown.

d. The employment category "Other Industries", consisting mainly of agriculture, forestry and fisheries, can be assumed to generate few jobs in the New Community -- say 20% of "Benchmark".

This analysis leads to the preliminary conclusion that about 60 blue-collar jobs, 35 retail jobs, 60 service jobs and 5 "other" would be required locally to support each 1,000 people in the projected population. This represents a total of 160 jobs per 1,000 population on this basis.

TABLE XII

NEW COMMUNITY ESTIMATE OF LOCALLY GENERATED EMPLOYMENT BY JOB CATEGORY PER 1,000 POPULATION

	Benchmark Jobs/ 1,000 Pop.	Percent Provided Locally	Local Jobs/ 1,000 Pop.
Construction	19	60% = 120[1]	10
Manufacture	109		0
Railroad	3		1
Other Transportation	13		10
Comm. and Utils.	13		10
Wholesale	19		9
Eat and Drink	12	60% = 35	9
Retail	47		26
Bus. and Rep. Serv.	12	50% = 60	3
Private Households	6		2
Pers. Service	13		5
Hospital Service	15		12
Educational Service	27		24
Professional Services	22		4
Public Administration	24		10
Other	25	20% = 5	5
TOTAL			160

[1] Less Manufacturing, see text.

A community of 42,000 people would provide nearly 6,000 local jobs; 25,000 people would generate nearly 3,400 jobs. A complete breakdown of this employment is given in the statistical profile of each Model in the Appendices.

Regionally Generated Employment

In addition to the local employment estimated above, we must also take account of jobs generated by institutions located in the New Community but serving a regional or city-wide function. This regionally generated employment consists of the Boston Campus of the University of Massachusetts and any other retail and commercial office employment which might be attracted to the site.

a. University of Massachusetts

This campus is expected to grow from 5,000 students and 1,250 employees to 15,000 students and 2,850 employees. In each case, the employment figures include graduate teaching assistants.

b. Industrial and Commerical Employment

To supplement the employment generated to serve the local needs of the Community, it will be possible to attract other employment serving a city-wide or regional market.

From a preliminary investigation, it seems unlikely that a significant amount of manufacturing activity could be attracted to this location.

Not only do long establish trends at both regional and national levels suggest the improbability of such an event, special characteristics of the site support this conclusion.

A constricted site area is the first factor. A survey of recently constructed plants in the SMSA shows that the ratio of the area designated for future expansion, to area in present use, ranges from 1:1 to 1:40, with a median of 1:5. It seems unlikely that many firms in expanding industries would locate on the constricted sites provided by the Harbor Islands.

A second problem presented by the site is the relatively low accessibility for heavy trucking. Although the comparative transport insensitivity of many industries important to the region would tend to play down this factor, the Harbor Islands would still labor under a disadvantage compared to other sites competing for industrial development.

However, it seems very probable that the New Community could attract other kinds of economic activity that would be more desirable than manufacturing activity in terms of wage levels of employment density. The environment, the location and the labor resources of the New Community would be expected to attract employment in the Business Service Industries, Research and Design firms, Medical, Educational and Training facilities or in the clerical and data-processing services of the Finance, Insurance and Real Estate Industries.

There are too many unknowns to make a firm estimate of the number of such jobs that could be provided in the New Community. The public image and prestige of the development would be an important variable. Also, the socio-economic composition of the population. A third factor is success in attracting one or two large firms to act as a magnet to draw other business. The quality of shopping facilities serving clerical staff and the quality of the public transit system are other variables. Given this uncertainty it seems that the New Community could attract anywhere from 5,000 to 7,500 jobs from the land-intensive, labor-extensive growth industries listed above. Short of a market survey of potential employers, there is little way to improve on this estimate at this stage.

Summary

A total of 16,000 jobs is estimated for a Community of 42,000 people (Models A and B). For a population of 25,000 the corresponding estimate is 11,000. Given the many uncertainties attached to this estimate, these figures could vary widely. Ranges of 11,500 - 16,100 and 8,00 - 12,000 give a better indication of the employment levels to be expected.

The land required to accommodate this economic activity is shown for each Model in the appendices A, B, C and D. Excluding the employment generated by the University of Massachusetts, Boston, space for 13,500 jobs is estimated for Models A and B. Assuming 200 square feet of building area per job and a floor area ratio of 1, about 65 acres of land is required.

The same assumptions for Models C and D result in a land use requirement of 40 acres to accommodate 8,400 jobs.

For the purposes of estimating tax revenues from commercial and office properties, 2 million square feet of taxable space is assumed for Models A and B; and 1.2 million for Models C and D. This assumes that about 25% of the jobs in the New Community will be in tax exempt institutions.

APPENDIX G TABLE XIII (a)
PROPERTY TAX REVENUES - NEW COMMUNITY MODEL A
($ MILLIONS 1969)

A. RESIDENTIAL

Income Group $000's	% of Population	Average Income	Ave. Annual Rent	# Units	Gross Rent $000's	Tax Rate[2] % Gross Rent	Tax Revenues $000's
0-4	10%	$3,000	$1,375[1]	1,260	$1,735	15%	$260
4-7	30%	$5,500	$1,375	3,780	$5,200	15%	$780
7-10	30%	$8,500	$2,120	3,780	$8,000	25%	$2,000
10-14	20%	$12,000	$3,000	2,520	$7,560	28%	$2,120
14+	10%	$16,000	$4,000	1,260	$5,040	28%	$1,420
Subtotal							$6,580

B. COMMERCIAL	Square Footage (Millions)	Rent/S.F.	Gross Rent[2] (Millions)	Tax Rate[2]	Tax Revenue (Millions)
Retail	1.00	$5.00	5.00	30%	$1.50
Office	1.00	$7.00	7.00	23%	$1.60
Subtotal					3.10
GRAND TOTAL					9.68

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[1] Including supplement

[2] Source: City Assessor

TABLE XIII (b)
PROPERTY TAX REVENUES-NEW COMMUNITY MODEL B

($ MILLIONS 1969)

A. RESIDENTIAL

INCOME GROUP ($000's)	% OF POPULATION	AVERAGE INCOME	AVERAGE ANNUAL RENT	NUMBER OF UNITS	GROSS RENT (MILLIONS)	TAX RATE[2] (% OF GROSS RENT)	TAX REVENUES (MILLIONS)
0-4	10	$ 3,000	$ 1,375[1]	1,260	$1.74	15%	$0.26
4-7	20	5,500	1,375	2,520	3.47	15	0.52
7-10	20	8,500	2,120	2,520	5.34	25	1.34
10-13	20	11,500	2,880	2,520	7.26	28	1.03
13-16	15	14,000	3,500	1,890	6.62	28	1.85
16-20	10	17,000	4,000	1,260	5.04	28	1.41
20+	5	21,000	4,700	630	2.96	28	0.83
Subtotal				12,600			8.24

B. COMMERCIAL

	SQUARE FOOTAGE (MILLIONS)	RENT/S.F.[2]	GROSS RENT (MILLIONS)	TAX RATE[2]	TAX REVENUE (MILLIONS)
Retail	1.00	$5.00	$5.00	30%	$ 1.50
Office	1.00	7.00	7.00	23%	1.60
Subtotal					3.10
GRAND TOTAL					11.54

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[1] Includes Supplement

[2] Source: City Assessor

TABLE XIII (c)
PROPERTY TAX REVENUES - NEW COMMUNITY MODEL C
($ MILLIONS 1969)

A. RESIDENTIAL

Income Group $000's	% of Population	Average Income	Ave. Annual Rent	# Units	Gross Rent (Millions)	Tax Rate[2] % Gross Rent	Tax Revenues (Millions)
0-4	10%	$3,000	$1,375[1]	750	$1,030	15%	$0.15
4-7	30%	$5,500	$1,375	2,250	3,090	15%	0.46
7-10	30%	$8,500	$2,120	2,250	4,770	25%	1.19
10-14	20%	$12,000	$3,000	1,500	4,500	28%	1.26
14+	10%	$16,000	$4,000	750	3,000	28%	0.84
Subtotal							3.90

B. COMMERCIAL	Square Footage (Millions)	Rent/S.F. 2	Gross Rent (Millions)	Tax Rate 2	Tax Revenue (Millions)
Retail	0.60	$5.00	$3.00	30%	$0.90
Office	0.60	$7.00	4.20	23%	0.97
Subtotal ($000's)					1.87
GRAND TOTAL					$5.77

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1 Including supplement

2 Source: City Assessor

TABLE XIII (d)
PROPERTY TAX REVENUES - NEW COMMUNITY MODEL D
($ MILLIONS 1969)

A. RESIDENTIAL

INCOME GROUP ($000's)	% OF POPULATION	AVERAGE INCOME	AVERAGE ANNUAL RENT	NUMBER OF UNITS	GROSS RENT (MILLIONS)	TAX RATE[2] (% OF GROSS RENT)	TAX REVENUES (MILLIONS)
0-4	10	$ 3,000	$ 1,375[1]	750	$1.03	15%	$0.16
4-7	20	5,500	1,375	1500	2.06	15	0.31
7-10	20	8,500	2,120	1500	3.18	25	0.78
10-13	20	11,500	2,880	1500	4.32	28	1.21
13-16	15	14,000	3,500	1125	3.95	28	1.11
16-20	10	17,000	4,000	750	3.00	28	0.84
20+	5	21,000	4,700	375	1.76	28	0.49
Subtotal							4.90

B. COMMERCIAL

	SQUARE FOOTAGE (MILLIONS)	RENT/S.F.[2]	GROSS RENT	TAX RATE[2]	TAX REVENUE (MILLIONS)
Retail	0.60	$5.00	$3.00	30%	0.90
Office	0.60	7.00	4.20	23%	0.97
Subtotal					1.87
GRAND TOTAL					6.77

[1] Includes Supplement

[2] Source: City Assessor

APPENDIX H

CAPITAL COST ESTIMATES AND FUNDING PROJECTIONS

The following notes, summarized in Table IV, detail the cost estimates prepared for the four New Community Models tested. Estimates such as these are bound to be approximate until design and engineering studies have been completed.

The cost estimates for Models C and D are recalculated on the basis of the unit costs prepared for Models A and B. In this process costs for land acquisition, bridges and arterial roads remain unaltered. Costs for rapid transit are discounted because this population is too small to support a rail transit system and the start-up costs of a bus system are counted as operating costs. Costs for local roads, utilities and community facilities are recalculated on the basis of the reduced population. Costs for open space are expanded on the basis of the increased acreage in recreational use. These detailed calculations are not included in this Appendix.

A. LAND ACQUISITION

1. Columbia Point (49 acres) is owned by the City of Boston (17 acres) and the BHA (32 acres).

    a. Capital Cost - The two portions are valued at $550,000 and $1,000,000 respectively (by the BRA for the ADL/Expo Study).

    b. Funding - Purchase by the Community Development Corporation under Title IV (New Community Act Guaranteed Loan).

2. Thompson Island (157 acres) is totally owned by Thompson Academy.

    a. Capital Cost - The land value is estimated (by the BRA for the ADL/Expo Study) to be $2,000/acres for sound land and $400/acre for mud flats. We have applied a value of $4,000/acre to facilitate acquisition from Thompson Academy.

    b. Funding - Purchase by Community Development Corporation under Title IV.

3. Spectacle Island (74 acres) is owned by East Coast Realty Corp. (2.1 acres), Boston Edison (23.7 acres) and the City (48.1 acres).

    a. Capital Cost - Assume a purchase price of $4,000/acre for privately owned land and $2,000/acre for City owned property.

    b. Funding - Purchase by Community Development Corporation under Title IV.

4. Long Island is owned by the City of Boston (213.1 acres) and the U.S. Government (0.01 acres - lighthouse).

    a. Capital Cost - The assumed purchase price is $10,000/acre.

    b. Funding - Purchase by Community Development Corporation under Title IV.

Note: Another 50 acres will be obtained through land fill. Because all of the fill will be used for beaches, the cost is included in beaches under Recreation.

B. AUTO-TRANSPORTATION

1. Bridges to link Columbia Point, Thompson Island, Spectacle Island and Long Island. No improvement needed to existing Long Island Bridge.

    a. Capital Cost - Costs are based on 12 foot traffic lanes and include median barriers, etc. Assume a 70 foot minimum clearance over Columbia Point--Thompson Island Channel. (Source: Professor Clarkson, MIT)

	WIDTH	LENGTH	@ $	COST(MILLIONS)	
Columbia Point -	60'	1,000'	50/SF	$3.0	
Thompson Island Bridge	60'	3,000'	30/SF	5.4	
					$9.4
Thompson Island -	60'	2,000'	20/SF	$2.4	
Spectacle Is. Bridge	60'	500'	30/SF	0.9	
					$3.3
Spectacle Island - Long Island Bridge	60'	2,000'	20/SF		$2.4
TOTAL					$15.1

Note: Cost of Bridges under transit right of way included under transit costs.

b. Funding - Assume that some new funding structure will replace the Federal Interstate formula. This new structure will be similar to the funding for Federal Aid to Primary and Urban Highways (PL 86-624, 1960) under which the Federal Government contributes 50% of costs plus 100% of costs necessary to eliminate highway crossings. Assume the following formula:

Federal share	50%
State share (from C.H. 90 Roads)	25%
Developer's share	25%
	100%

Note: An additional 20% might be eligible for federal funding under Title IV.

2. Arterial Roads

a. Capital Costs - Highway costs include shoulders, medians, etc. and assume no "steep" slopes or "massive" earthworks (source: Mike Collins, BRA Engineering).

	WIDTH	LENGTH	@ $	COST (MILLIONS)	
Columbia Point	6 Lanes	3,000'	600/LF	$1.8	
Thompson Island	6 Lanes	7,000'	600/LF	4.2	
Spectacle Island	4 Lanes	3,500'	500/LF	1.75	
Land Island	4 Lanes	5,500'	500/LF	2.75	
TOTAL					$10.50

b. Funding - Assume 50% federal, 25% state, 25% developer funding for highway as for bridges.

Note: As for #1 above.

3. Southeast Expressway Connection cost can vary widely pending detailed study.

   a. Capital Cost - Assume $1,000,000.

   b. Funding - Assume 50% Federal, 25% State, and 25% Developer.

4. Local Roads will have ongrade crossings and no unusual earthworks. (Source Professor Clarkson. MIT)

   a. Capital Cost - Unit costs of $16,000/100' include pavement, etc. Assume 48,600 feet of local roads. Total $7.77 million.

   b. Funding - Assume 20% Federal (under New Community Act, Title IV). 80% Developer

C. RAPID TRANSIT

1. Bridges

   a. Capital Cost -

	WIDTH	LENGTH	@ $	COST	(MILLIONS)
Columbia Point	25'	1,000'	50/SF	$1.25	
Thompson Island	25'	3,000'	30/SF	2.25	
					$3.50
Thompson Island	25'	500'	30/SF	0.375	
Spectacle Island	25'	1,000'	20/SF		$1.375
Spectacle Island	25'	2,000'	20/SF		$1.00
Long Island					
TOTAL					$5.875

   Source: Clarkson, MIT

   b. Funding - Department of Transportation capital grant 67% MBTA 33%.

2. On Bridge Trackage

   a. Capital Cost - Unit costs for On Bridge Trackage are broken down as follows:

Double Track With Third Rails	$ 80/LF
Signals and Communication	50/LF
Power, etc.	115/LF
Fencing	6/LF
	$157/LF

   Source: Ed Bailey, BRA

Columbia Point-Thompson Island: 4,000' @ $157/LF =	$628,000
Thompson Island-Spectacle Island: 2,500' @ $157/LF =	$393,000
Spectacle Island-Long Island: 2,000' @ $157/LF =	$312,000
	$1,333,000

b. Funding - Department of Transportation capital grant 67% MBTA 33%.

3. On-Grade Trackage

a. Capital Costs -

Double Track with Third Rails	$80/LF
Signals and Communication	50/LF
Subgrade and Drainage	20/LF
Power, Substations, Tramsmission etc.	115/LF
Fencing	6/LF
	$177/LF

Source: Ed Bailey, BRA.

Columbia Point:	3,000'	@ $177/LF =	$ 531,000
Thompson Island:	7,000'	@ 177/LF =	1,240,000
Spectacle Island:	2,500'	@ 177/LF =	620,000
Long Island:	1,000'	@ 177/LF =	177,000
			$2,568,000

b. Funding - Department of Transportation capital grant 67% MBTA 33%.

D. UTILITIES

1. Water

a. Capital Cost - The costs of trunk and branch lines as estimated as follow:

Trunk - Neponset Bridge - Squantum Point	10,000'	@ $30/ft =	$ 300,000
Trunk - Squantum - Thompson Island	1,350'	@ 30/ft =	40,000
Trunk - Thompson Island	5,000'	@ 30/ft =	150,000
Trunk - Thompson - Spectacle Island	3,000'	@ 30/ft =	90,000
Trunk - Spectacle Island	3,000'	@ 30/ft =	90,000
Trunk - Spectacle - Long Island	3,900'	@ 30/ft =	120,000
Trunk - Long Island	10,000'	@ 30/ft =	300,000
Trunk - Columbia Point	7,000'	@ 30/ft =	210,000
Branch - Columbia Point	10,000'	@ $20/ft =	200,000
Branch - Thompson Island	20,000'	@ 20/ft =	400,000
Branch - Spectacle Island	15,000'	@ 20/ft =	300,000
Branch - Long Island	30,000'	@ 20/ft =	600,000
			$2,800,000

Source: Edward Pinkul. Public Works Department

b. Funding - Federal:

Basic Water and Sewer Facilities	50%
Title IV Capital Grant	20%
Community Development Corporation	30%

2. Sewers

a. Capital Cost - The costs of trunk and branch lines are estimated as follow:

Trunk - Spectacle - Thompson Island	3,000'	@ $30/ft =	$ 90,000
Trunk - Thompson Island	5,000'	@ 30/ft =	150,000
Trunk - Spectacle - Long Island	3,900'	@ 30/ft =	120,000
Trunk - Long Island	10,000'	@ 30/ft =	300,000
Trunk - Columbia Point	7,000'	@ 30/ft =	210,000
Branch - Specatacle Island	15,000'	@ $20/ft =	300,000
Branch - Thompson Island	20,000'	@ 20/ft =	400,000
Branch - Long Island	30,000'	@ 20/ft =	600,000
Branch - Columbia Point	10,000'	@ 20/ft =	200,000
			2,370,000
Connect to existing system (Source: MDC, Mr. Hayes)			700,000
			$3,070,000

b. Funding -

Federal:	Basic Water and Sewer Facilities	50%
	Title IV Capital Grant	20%
	Community Development Corporation	30%

3. Pumping Assume all sewage pumped to existing trunk sewers with no treatment on site.

a. Capital Cost - Allow $1,000,000.

b. Funding -

Federal:	Basic Water and Sewer Facilities	50%
	Title IV Capital Grant	20%
	Community Development Corporation	30%

4. Power includes transformers, underground distribution, telephone and communication conduits.

a. Capital Cost - $7,500/acre. (Source Hanscombe Roy Associates for Expo '76)

b. Funding - 100% by utility companies.

5. Gas

a. Capital Cost - $2,000/acre. (Source: Hanscombe Roy Associates for Expo '76)

b. Funding - 100% by Boston Gas.

E. COMMUNITY SERVICES AND FACILITIES:

There will be a Central Community Services Complex in which the main Health Center, Library, Little City Hall and Social Service Center will be located. Branches of these various facilities may also be located in the residential areas or shopping centers, depending on the nature of the service.

The high school will be another central complex. Many of its facilities can be used by the community during non-school hours, e.g., swimming pool, gymnasium, auditorium, etc. The elementary and junior high schools will also be so utilized.

Other services and branches, depending on their nature, will be located in residential areas (e.g., day care), shopping areas (e.g., library) or separately (e.g., fire station).

1. Community Center The Community Center will provide area for such activities as legal aid, family counselling, and employment services. Assume that the total floor area for social services is 50,000 sq. ft.

   a. Capital Cost -

median costs: $19.00/sq.ft.	$ 950,000
high costs: $36.50/sq.ft.	1,825,000
plus 15% for furnishings:	
median costs	1,093,000
high costs	2,100,000

   (Source: Robert Show Means Co., Inc., Building Construction Cost Data 1969, Duxbury, Mass. Adjusted for Boston prices.)

   b. Operating Costs - The Charlestown Life Services Center provides community services at a cost close to $55/person. The New Community provides comparable services at the same price; total operating costs will be $2,324,000.

   c. Funding-Capital Costs - Neighborhood Facilities (HUD 703) grants provide up to 2/3 of the construction ocsts of multi-service neighborhood center.

   (Source: Office of Economic Opportunity, Catalog of Federal Domestic Assistance, January 1969, p. 327).

   The developer may be asked to supply the remaining costs.

   Other sources of capital costs could be:

   1. Public Facility Loans (P.L. 84-345, 69, Stat. 635, 642, Catalog, op. cit., p. 282).
   2. The State.

d. Funding - Operating Costs - The Neighborhood Service Program (NSP grants) may be used in conjunction with Neighborhood Facilities. Assume this program also pays 2/3 costs.

The Community Association can finance the remaining 1/3.

2. Media Center - The CENTRAL MEDIA CENTER will be part of the Community Service Complex. Another branch should be included in the New Community to provide enough facilities for 40,000 people. Ideally, school libraries and the media centers should work together to avoid unnecessary duplication and in lending volumes. (Traditionally, however, the Boston school and library systems have been reluctant to work together.)

Assume that the media centers conform to the recommended book and space requirements:

(1) 2 1/2 - 2 3/4 books/capita or 105-116,000 volumes

(2) 0.5 - 0.6 sq. ft./capita or 21,120-25,350 sq. ft.

(Source: Joseph L. Wheeler and Herbert Goldhor, Practical Administration of Public Libraries, Harper & Ros, N.Y., 1962,. p. 554).

a. Capital Costs -

1. Building and furnishings: (Source: Building Construction Data 1969, op. cit.)

median costs: $22.20/sq. ft.	$ 469,900-$562,800
high costs: $75.00/sq. ft.	$1,903,300
plus 15% for furnishings:	
median costs:	$ 705,000-$845,000
high costs:	$2,189,000

2. Books (Source: Ann Wolpert, B.R.A. Librarian)

cost of book: $5-$12.00
cost of processing/book: $5.00

median cost of 110,000 volumes at total cost of $13/book:

$1,430,000

high cost of 116,000 volumes at total cost of $17/book:

$1,972,000

3. Total Capital Costs

median =		high:
$ 800,000		$2,189,000
1,430,000		1,972,000
$2,230,000		$4,021,000

Note: Median Costs used.

b. Operating Costs -

Operating costs per person in Boston in 1964-65 were $7.00.

(Source: Advisory Commission on Intergovernmental Relations, Fiscal Balance in American Federal System, Vol. 2, p. 146).

Allowing for a 25% increase in costs and multiplying by 42,240, total operating costs are $3,696,000.

c. Funding - Capital Costs -

1. Library Services and Construction (P.L. 90-154, Stat. 509) grants funds for library construction. The Federal Government, however, has not been putting much money into this area so that it is unlikely that more than 10% of capital costs will be provided.

   Neighborhood Facilities (HUD 703) should provide funds since the library is part of a multiservice center. Assume it will fund about 1/4 cost. If not, a Public Facility Loan (Catalog, op. cit., p. 282) can be used.

2. Traditionally the City has financed libraries, and it will fund the bulk of capital costs.

d. Funding - Operating Costs -

1. Library Services and Construction also grants funds to pay salaries and other operating costs. Again assume 10%.

2. The City generally pays library operating costs.

3. Additional funds may also come from private contributions.

3. Police Public order and safety will be provided, for the most part, by squad cars. Any central facility which is needed can be included in the Little City Hall. Assume that 150 policemen will provide the necessary services.

a. Capital Cost - There are no capital costs because a separate police station is unnecessary. (Source: William Pear, Public Facilities Department)

b. Operating Cost - Operating costs are $1 million for 100 policemen. This includes the cost of equipment (e.g., squad cars). Therefore, the total operating cost will be $1,500,000.

(Source: John Howland, Superintendent of Police, Boston)

c. Funding - Operating costs are funded by the City

4. Fire Fire Protection will be provided by 2 fire stations, each of which occupies 15,000 sq. ft.

   a. Capital Cost -

median cost: $20.44/sq. ft.	$ 613,000
high cost: $40.20/sq. ft.	$1,206,000

   Note: Median cost used (Source: Building Construction, op cit.)

   b. Operating Costs - Operating costs per capita in Boston in 1964-65 were $23. Allowing for inflation of 25% and a population of 42,240 results in total operating costs of $1,214,400.

   c. Funding - The City generally pays capital and operating costs of the fire department.

5. Day Care Day care should be provided for pre-school children. Those aged 3-4 yrs. can be cared for in group situations of 15 children per class in units of 60. The units will be located in residential buildings and community centers. Younger children can be accommodated in family day care situations in which not more than 3 children may be cared for in a home.

   Assume that there are 3,351 children of ages 0-2 and 1,969 children aged 3-4. Moreover, assume that of these children 1,000 of each group participate in full day care programs (or approximately 50% of the older group and 30% of the younger group).

   a. Capital Cost - Capital costs of new construction for day care in a center amount to $2,500/child. This figure can be decreased somewhat by utilizing rooms which have other evening uses. (Source: Commonwealth of Massachusetts, Office of Planning and Program Coordination, Day Care Planning In Massachusetts, March, 1969)

   Providing space for 1,000 of the 3-4 yr. old New Community population will require $2,500,000.

   Because the youngest children are cared for in homes there is no capital cost for them.

   b. Operating Costs -

center day care: $1,862/child	$1,862,000
family day care: $2,032/child	$2,032,000
	$3,894,000

   (Source: Day Care Planning in Massachusetts)

c. Funding - Capital Costs -

1. Child Welfare Research and Demonstration Projects (CWR & D) will supply funds if the day care program has some innovative or demonstrative significance. (Catalog, op. cit., p. 242.) Assume this program will pay $1,000,000.

2. Neighborhood Facilities will provide between 1/3 and 2/3 of the funds required for day care located in multipurpose centers. Assume almost 1/2 of the services are located in the multipurpose centers.

3. The State Welfare Department should pay some of the costs.

4. The developer can handle a portion of capital costs and then be reimbursed by the renters association.

d. Funding - Operating Costs -

1. Head Start will supply up to 80% of costs (Catalog, op. cit., p. 491)

2. Child Welfare Services is a federal program operating through the State. The Welfare Department will also support day care services.

3. Those parents who can afford it should pay a portion of the fee.

6. Health Services Health services will be provided by comprehensive health centers, nursing homes and extended care facilities in housing for the elderly. There will be no major in-patient facilities. Forty-Five per cent of the services will be in neighborhood clinics, 40% in extended care facilities and 15% as part of the central multiservice center.

a. Capital Cost 1) Comprehensive health clinics require 1.16 sq. ft. per person in neighborhood and central health facilities.

(Source: Roxbury Community Comprehensive Health Clinic and Building Construction Data, op. cit.)

median costs:	$21,20/sq. ft.	$1,040,000
high costs:	$37.00/sq. ft.	$1,820,000

2. The extended care/nursing home facilities will require 200 beds.

(Source: MAPC Health Care Facilities Report and Building Construction Data, op. cit.)

median costs:	$7,000/bed	$1,400,000
high costs:	$17,000/bed	$3,400,000

3. Total Capital Costs:

median:	$1,040,000	high:	$1,820,000
	1,400,000		3,400,000
	$2,440,000		$5,220,000

Note: Median costs used.

There are other methods in calculating costs. In particular, varying and inconsistant figures can be obtained for extended care facilities. Nevertheless, the median figure above appears reasonable.

b. Operating Costs - Operating costs will be about $190 per person for non-hospital care. (Source: Charlestown Life Services Center)

$8,025,000

Note: Extended care facilities not included.

c. Funding - Capital Costs

1. Health Facilities Construction (Hill-Burton Program) grants between 1/3 and 2/3 of capital costs. Loans may be given in lieu of grants (Catalog, op. cit., p. 198)

2. Neighborhood Facilities grants will provide up to 2/3 of costs for health centers included in multiservice facilities.

3. Other federal sources of funds are:

   a. Comprehensive Health Planning - Grants to States (Catalog, op. cit., p. 194)

   b. Comprehensive Health Care (Catalog, op. cit., p. 196)

   c. Comprehensive Health Centers (Catalog, op. cit., p. 487)

d. Funding - Operating Costs -

1. Health Services Development (Partnership for Health) provides operating costs for some initial period. (Catalog, op. cit., p. 200) Assume it pays 40%.

2. Other federal sources are:

   a. Public Health Comprehensive Services (Partnership for Health) - via State (Catalog, op. cit., p. 212)

   b. Health of School and Pre-School Children Projects (Catalog, op. cit., p. 276)

   c. Comprehensive Health Centers (Catalog, op. cit., p. 487)

3. The State Welfare Department, with assistance from Medicaid and Medicare, provides health services for those on welfare and those who cannot pay medical expenses.

4. Individuals who can afford it can be asked to pay for health services.

7. Education Public schools are assumed to provide space for 75% of the children in the community, since approximately 23% of elementary and 28% of higher education has traditionally been provided by private or parochial school (based on MAPC data). Note that some students may also attend high schools in Boston. The school age population of the New Community is 10,750 children, so 8,062 pupils are assumed to attend public schools. Of the other children, 10% are assumed to attend private or parochial schools in the New Community and the rest are assumed to attend schools outside the community. Therefore, schools will be built for 9,137 students.

a. Capital Costs - $5,000/pupil = $45,685,000 for 9,137 students

(Source: William Pear, Department of Public Facilities for the City of Boston)

b. Operating Costs - for the City of Boston are about $600 per pupil = $5,482,100.

c. Funding - Capital Costs -

1. The State pays 40% of the capital costs of public schools. It will fund 65% instead if the school can show that it has taken specific action to improve racial balance.

2. The City funds the remaining public school costs.

3. A non-profit developer such as Thompson Academy will finance the private school costs.

d. Funding - Operating Costs -

1. The Federal Government pays 2% of the cost of operating Boston schools. (Source: Annual Report of the Boston School Department 1967-68)

($129,000)

2. The State pays 25% of public school operating costs.

($1,612,500)

3. The City is responsible for the remaining public school costs.

($4,708,500)

4. The trustees of a private or parochial school will obtain private funds to run it.

8. City Hall The Little City Hall will include a court, post office, and space for community government. Assume that an area of 20,000 square feet is provided.

   a. Capital Costs -

median costs	$27.10/sq.ft.	$542,000
high costs	$47.00/sq.ft.	$940,000

   Note: Median cost used.

   (Source: Building Construction Data, op. cit.)

   b. Operating Costs - Operating costs of general government in the City of Boston in 1964-65 were $23/capita. Allowing for inflation and multiplying by the assumed population results:

Total operating costs	$1,214,400

   (Source: Advisory Commission, op. cit., p. 146)

   c. Funding - Capital Costs -

      1. The Federal Government will fund the post office. Assume it occupies 1/5 of the area.

      2. The City will finance the remainder.

   d. Funding - Operating Costs - Operating costs for the Post Office, which would be paid by the Federal Government, are not included. Therefore, the City pays the total operating expense listed.

F. RECREATION

1. Beaches Fifty acres of landfill is assumed to extend existing beach areas and to stock new areas with sand.

   a. Capital Cost - Sand fill is estimated cost $2.50 - $3.00 per cu. yard barged from offshore areas near Plymouth. In water depths of 5 to 10 feet filled land is estimated to cost $3.00 - $4.50 per square foot. (Source: MIT Urban Systems Lab)

   For fill limited to the most suitable shallow areas the $3.00/square foot would apply. Over 50 acres this would amount to about $5 million.

   b. Funding - 50% under Federal Outdoor Recreation Financial Assistance.

   Fifty percent from MDC civil works construction and beach erosian grants (corps of engineers)

2. Open Space Apart from beach areas about 30 acres will be available for open space and playgrounds, divided between park (50%) peripheral (30%) and central (20%) types.

   a. Capital Cost - Including playground equipment the average cost would be about $27,000 per acre. (Source: Hanscombe Roy Assoc.)

   b. Funding - Fifty percent Federal Open Space Land. The remainder would be financed by the Community Development Corporation.

3. Marinas Two small marinas.

   a. Capital Cost - Preliminary estimate of $250,000 each.

   b. Funding - Fifty percent under federal outdoor recreation financial assistance remainder shared by Community Developer (60%) and Marina Developer (40%).

G. HOUSING

1. Low Income Housing Constructed by Non-profit or limited-dividend developers under Turnkey or Leased Public Housing, Rent Supplement, Elderly Housing, and Home Ownership Programs.

   a. Capital Cost - assumed unit cost of $17,500 including all utilities and on-site work, but excluding site aquisition.

   b. Funding - under Federal and State programs listed above.

2. Moderate Income Housing, constructed by non-profit or limited-dividend developers under Home Ownership Assistance (Section 235), Rental and Cooperative Housing Assistance (Section 236), Section 202 Elderly Housing Programs and MHFA BMIR Mortgage Loans.

   a. Capital Cost- assumed unit cost of $17,500 for families earning $4,000-$7,000; $19,000 for families earning from $7,000-$10,000. Unit cost includes utilities and all on-site work but excludes land acquisition.

   b. Funding - Under Federal and State programs listed above.

3. Market Housing Constructed by profit-oriented developer using conventional financing at market interest rates.

   a. Capital Cost - Assumed unit cost of $20,000 for families earning $10,000 - $14,000; $25,000 for families more than $14,000. Unit cost excludes site aquisition.

   b. Funding - Conventional sources of financing.

H. RETAIL AND COMMERCIAL

Constructed by profit-oriented developer using conventional financing at market interest rates.

a. Capital Cost - $20/SF and $15/SF for commercial and retail respectively.

b. Funding - Conventional sources of financing.

H757N

Reference (Harbor Islands)

New Community Study.

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